

ASSISTIVE TECHNOLOGY PROVISION:
AN ASSESSMENT OF SERVICES AND SUPPORTS FOR
PEOPLE WITH DISABILITIES IN
NEWFOUNDLAND AND LABRADOR

VALERIE M. PENTON

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WITH DISABILITIES IN NEWFOUNDLAND AND LABRADOR**

by

Valerie M. Penton, BSc (Hons)

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Abstract

This study assessed the gaps in provision of assistive technology (AT) services and supports for people with disabilities in Newfoundland and Labrador (NL), and reviewed available evidence on the efficacy of single-entry point systems for future planning and policy change. The mixed method research design included a survey of post-secondary students and adults with vision, hearing, mobility, learning or other disabilities, who are users of AT devices or supports (n = 49), and individual interviews with disability service providers (n = 8) in community and post-secondary settings throughout the province. Documents describing existing single-entry point systems and similar programs currently in operation in NL were analyzed as well. Findings indicate that knowledge gaps exist within and between end users or consumers of AT and service providers in community organizations and academic institutions. Although the potential benefit of AT is recognized there is dissatisfaction with the current delivery of AT services and supports for people with various disabilities throughout the province. The need for increased training services for both consumers and service providers was strongly identified. Policy alternatives have been suggested, such as increased coordination of services, a single-entry point system and subsidy programs for AT similar to other provinces in Canada.

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List of Acronyms

AT	Assistive/Adaptive Technology
ADP	Assistive Devices Program
ALD	Assistive Listening Device
ATD	Assistive/adaptive technology device
CAT	Comprehensive Assistive Technology model
CHHA-NL	Canadian Hard of Hearing Association- NL
CNIB	Canadian National Institute for the Blind
HAAT	Human Activity Assistive Technology
HRSDC	Human Resources and Social Development Canada
ICF	International Classification of Functioning, Disability & Health
ILRC	Independent Living Resource Centre
LDANL	Learning Disabilities Association of Newfoundland & Labrador
LMAPD	Labour Market Agreement for Persons with Disabilities
MPT	Matching Person to Technology
NISAT	National Information System for AT
NL	Newfoundland and Labrador
PALS	Participation and Activity Limitation Survey
SEP	Single-Entry Point
WHO	World Health Organization

Chapter 1 – Introduction

“Imagine not being able to tell your doctor that you are getting an extreme pain in your right side, and then if you can take your laptop and type in to your doctor and show him the screen, then great. Then all of a sudden your health care changes” (S. Ralph, Coalition of Persons with Disabilities, personal communication, March 20, 2009). This quote illustrates the dramatic improvement in health that having the right assistive technology at the right time can make for someone living with a disability.

Assistive technology (AT) also known as *assistive devices* or in the case of computer-related devices, *adaptive technology*, refers to a range of devices and supports available to assist people with various cognitive, sensory, physical, communication, learning, and other challenges that limit participation and learning opportunities (Hopkins, 2004). Assistive technology includes wheelchairs, magnifying and other reading devices or computer software, augmentative and alternative communication (AAC) products and equipment for eating and grooming (Hopkins, 2004).

AT enables people with permanent or temporary disabilities to complete tasks that they would otherwise find difficult or impossible to do. For example, if you develop carpal tunnel syndrome (a condition which occurs when the nerve running from the forearm into the hand, becomes compressed at the wrist), AT may help you accomplish your work without using your hands. For example, voice activated phones and GPS technologies in vehicles are helping people talk on the phone or find travel directions without taking their hands off the steering wheel. Thus, AT can be useful to people with disabilities and those without disabilities.

Having the necessary supports is important to the AT user. (I use the term “user” to mean the consumer, the client, or person who uses AT.) AT users are better able to engage more independently in activities of daily living, accomplish educational and career goals and live more productive and healthy lives (Butterfield & Ramseur, 2004; Strobel, Fossa, Arthanat & Brace, 2006). Lack of funding programs and effective mechanisms for assessment, distribution, and training support means that many people with disabilities are often underserved or dissatisfied with AT services (Hoppestad, 2007). This compounds the hardships for people with disabilities who are more likely to live in poverty and social exclusion. Too often, policy and program decisions are made without taking into account the perspectives of the users of AT services (Scherer, 2005b).

Research Purpose and Objectives

The purpose of this research was to determine the current status of AT service delivery in Newfoundland and Labrador (NL). Specifically, I set out to assess the experiences, opinions and satisfaction levels of adult consumers and disability service providers in various locations in the province,

The objectives for this research study were to:

1. Determine if AT devices have a positive impact on independence, performance, productivity, community involvement, and self-assessed health of people with disabilities in this province;
2. Assess the strengths and limitations of current program delivery systems from the perspective of adult users and disability service providers;

3. Review evidence of various types, and effectiveness, of Single Entry Point (SEP) systems;¹ and
4. Generate recommendations for future planning and systemic change in the area of disability service delivery in NL.

Research Questions

The following research questions guided the development of the research design:

1. What are the perceptions of various stakeholders (adult consumers and disability service providers) regarding training, funding, and service delivery of AT in NL?
2. What are adult AT users' perceptions of the impact of AT on their lives?
3. How satisfied are adult users with their AT? What, if any, is the relationship between satisfaction with AT devices and services and self reported health status of these users?
4. What do adult AT users and disability service providers perceive to be the potential value of an SEP for AT in NL?
5. What changes need to be implemented to provide improved AT services to those with disabilities in NL?

Background

Locating myself.

Through my employment opportunities as an AT intern with the Independent Living Resource Centre (ILRC) NL in 2006, I gained an appreciation for the need of a

¹ A single-entry point (SEP) system for AT aims to assist consumers in obtaining the right AT services at the right time and to assist the service provider in making informed decisions about AT by providing the necessary tools and AT information at a single location. SEP systems are described further in Chapter 4.

comprehensive system whereby people with disabilities in NL could access AT services and supports in a more equitable manner. When I was presented with the opportunity to pursue research in an AT related area, I enthusiastically accepted. I subsequently became involved with the Learning Disabilities Association of Newfoundland and Labrador (LDANL) in 2008 and my personal connections to individuals with disabilities continued to be a motivating factor in my research efforts. These connections furthered my desire to locate resources that would maximize each person's potential, regardless of their disability.

My experience with working for these provincial disability organizations taught me that it is preferable to use "person first language." Therefore, throughout this document the term "person/consumer with a disability" is used instead of "disabled consumer" or "disabled person." This puts emphasis first on the person before the disability. The terms "client," "consumer," "end user," and "patient" used throughout this thesis reflect the perspective of the various organizations and agencies that I have conducted research with. Many not-for-profit and government organizations use the term "client" while organizations that follow the independent living principles/philosophy use the term "consumer." Through my engagement with these organizations, I have brought these perspectives to my research.

The ILRC NL is a consumer-controlled organization, committed to providing supports, resources and opportunities for empowerment, which enable persons with disabilities to make informed decisions about their lives. The principles of Independent

Living, as detailed by the ILRC in Halifax (2003) and followed by ILRC's internationally are:

1. Consumer Direction - Consumers have the right to set their own goals and make their own choices
2. Cross Disability Focus - Support and services are available regardless of the type or number of disabilities
3. Community Base - Consumers can identify issues in their own communities which affect their lives
4. Inclusion and Full Participation - People with disabilities are supported so that they may participate in all areas of the community (economic, political, cultural, and social)

Locating the study.

This thesis is a component of a larger project on the AT industry in Canada, undertaken by researchers from the Atlantic Regional Training Centre in Health Services Research.

AT provides significant opportunities for all individuals, especially for people with disabilities (e.g. cognitive, physical, visual, developmental, and behavioral disabilities) who experience different needs and challenges (Mendez, 2002; Strobel et al., 2006). AT enables a person with a disability to work around his/her area of challenge. AT does not provide a cure for a condition or disability but it does help the user to complete a task more independently (Hopkins, 2004).

Technology has many benefits, including the power to equalize and even liberate (Christ, 2008). The expanding use of technology is helping people access the services

and supports they need. Although increased access to necessary supports has been declared as the central foundation for inclusion and equal participation of Canadians with disabilities (CACL, 2005), persons with disabilities are typically underserved (Hoppestad, 2007). Technology (e.g. AT) provides people with opportunities on par with those of people without disabilities by removing barriers that prevent a person from full participation in all aspects of society because of a disability (Gordon, 2006).

Technological advances in the past decade have made it possible for individuals with moderate to severe disabilities to study independently, navigate their physical environment, and communicate with those in their surroundings (Bradley & Poppen, 2003; Christ, 2008).

In 2006, approximately 4.4 million (14.3%) of Canadians reported having a disability, compared to approximately 3.6 million (12.4%) of Canadians in 2001 (Statistics Canada, 2007). Mild disabilities were the most common, accounting for 35.4% of Canadian adults with disabilities while very severe limitations accounted for 13.5% (Statistics Canada, 2007). Currently, 2.3 million Canadian families provide daily support to a family member with a disability and 500,000 of these caregivers have a disability themselves (Gordon, 2006). About 80% of all care for older Canadians is still provided by close relatives and friends (Keefe, 2004). AT is becoming increasingly important as Canada's population is aging at an increasing rate (Statistics Canada, 2008b). As the "baby-boomers" (people born between 1946 and 1965) age, the seniors population is expected to rise significantly (PHAC, 2005). It is estimated that by the year 2025, one out of every five people will be age 65 or older, compared to just 1 in 8 in 2000 (CIHR, 2008). As a result, the disability

rate will significantly increase (Strobel et al., 2006; PHAC, 2005). For Canadians in 2006 this was especially true for disabilities associated with speech, memory, mobility, agility, seeing and pain (Statistics Canada, 2008b). As our population ages, the rising disability rate will have significant impacts on health care (Statistics Canada, 2008a).

NL is no exception with its aging population and increasing disability rate. Over the last 30 years, it has aged faster than any other province in the country with a median age of 41.3 years - the highest in Canada; in 2007, people over 65 made up about 13.9 per cent (69,000) of the population in this province. This is likely to increase to 20 per cent within 10 years (Gov. NL, 2007). The 2006 Participation and Activity Limitation Survey (PALS) reported that 74,510 Newfoundlanders and Labradorians have at least one disability, accounting for 14.9% of the population. This rate is up from 12.3% in 2001 and similar to the national rate of 14.3% (Statistics Canada, 2007).

As the average age of the provincial population continues to rise and with improved medical care sustaining better survival rates, we will have growing numbers of people with disabilities who will need services in this field. It is essential to look at more effective ways to meet these needs without overburdening the health care sector. People with disabilities, especially older adults, are interested in technological services and supports, such as AT, because it may provide support for them to remain living in their homes (Seelman, 2008). Thus, AT has the potential to improve the health of people as they age.

Students with disabilities are another population that are known to benefit from AT. Canadian studies have shown that students with disabilities need technologies that will

enable them to prepare and participate in the knowledge-based economy (Fichten et al., 1999). There is a clear and growing need for AT to help address the needs of students with disabilities in NL, as more and more students want to realize their full potential through education. Enrollment of students with disabilities in post secondary education is steadily increasing as is the demand for assistive computer technologies and services (Asuncion, Fichten, Barile, Fossey & Robillard, 2004; Christ & Stodden, 2005). Students with all types of disabilities report using or requiring the use of some type of AT such as keyboard modifications, screen magnification, spelling and writing aids, and voice output or dictation software (Fichten, Nyugen, Barile & Asuncion, 2007). Students with learning disabilities (LDs) were most likely to use AT software, with 95% of them using spelling and grammar checkers to improve writing quality (Fichten et al., 2007). The number of LDs has increased by 40% since 2001 (Statistics Canada, 2007). LDs are often termed the “invisible disability” category in the LD community, and it is within this category that AT can be especially important (Hopkins, 2004).

When managed effectively, technology has the potential “to reduce barriers and significantly improve chances for students in post secondary education to excel and move towards an independent and productive life” (Christ, 2008, p. 34). Frieden (2003) argued that “[c]ompletion of postsecondary education . . . significantly improves the chances of securing gainful and satisfying employment and achieving financial independence” (p. 2-3). With the expected increase in educational needs of student learners, a decrease in the availability of informal caregivers, and a shrinking long-term care workforce, AT is an

option to promote independence in learning and aging (Agree, Freedman, Cornman, Wolf & Marcotte, 2005; McCreddie, Wright, & Tinker, 2006; Wolf, Agree, & Kasper, 2005).

An environmental scan of NL revealed that there are several nonprofit organizations and educational institutions that have been instrumental in promoting awareness of AT and providing access to AT services to the population of people with disabilities (see Appendix A). For example, the ILRC, LDANL, the provincial branch of the Canadian National Institute for the Blind (CNIB) and some post-secondary institutions currently offer AT service delivery. It is important to look at these organizations and the AT services they provide in order to identify gaps that could be addressed by a more comprehensive system. These organizations will be looked at in greater detail in chapter 4.

In November 2005, the ILRC-NL, in partnership with the CNIB and Industry Canada, held an “In-Person” consultation to discuss current availability of access to computers, adaptive technology and the internet in the province. The meeting was an opportunity for community, academia, business, and government to come together to network, share information about programs and services they offer and strategize about ways of increasing access to technology. Towards the end of 2006, staff of the AT program began work on developing a provincial Adaptive Technology strategy developing a network of key stakeholders across NL. When this research was designed in 2009, there was a need to update previously gathered information to identify and address current need for AT service provision for the province.

Since the Government of Newfoundland and Labrador implemented its Poverty Reduction Strategy in 2006, changes have been made in the disability services sector of NL (Gov. NL, 2006). Most recently, changes have been implemented to the provincial tax systems, allowing families of persons with disabilities to avail of the new Registered Disability Savings Plan (RDSP) while ensuring that other levels of income support for persons with disabilities remain intact (Skinner, 2008). Although financial avenues are being implemented slowly in this province to help people acquire AT, there are still barriers that prevent people from accessing AT. A major problem is the lack of trained professionals to ensure that the needs of this population are fully addressed.

Research Rationale

Although there are increased AT supports in the province, an environmental scan of NL revealed a growing need for and development of AT services. Many anecdotal statements from disability service providers exemplified the need to have someone with a high degree of awareness and training to assist with using AT equipment. It was revealed that many organizations and agencies are equipped with AT, but they lack a skilled person to demonstrate how to use it. As a result, there is costly AT equipment and devices “just sitting on the shelves, collecting dust because no one knows how to use it.”

Many disability services are offered only in the urbanized centres of the province. Enthusiasm was expressed at the idea of having improved AT services and awareness throughout the province, especially in the more remote areas. This is similar to a study by Xueqin, Coyle, Wares, and Cornell (1999), who found that lack of transportation and long-distance driving pose a major concern to consumers in rural areas. In addition to this

are difficulties for families, caregivers and teachers traveling with the clients who have to take time off work or be away from home (Craddock, 2002).

One overall goal of this study was to assess whether it would be beneficial to have a single entry point (SEP) system for people with disabilities in NL in need of AT. Such a system would be similar to that developed for home care (MacAdam, 2000), as well as the AT program in British Columbia (AT-BC) which includes: technology assessment, consultation and provision of assistive technology, training on the use of the technology, repair and trouble shooting services (G. Loewen, personal communication, February 26, 2008). The goal of such programs is to provide equitable and viable options within the health delivery systems and to facilitate independence with reading, writing, and communication within training and employment environments (G. Loewen, personal communication, February 26, 2008; MacAdam, 2000).

In NL, children with disabilities are provided for by the Department of Education until they graduate from high school. They undergo an assessment process which enables them to receive accommodations that follow them through to graduation. When they become adults and wish to enter a post secondary institution to advance their career goals and enter the workforce, they often have to secure their own AT devices (Strobel et al., 2006). Therefore, this thesis considers the prospect of an SEP system concentrated on post-secondary students and adults with disabilities who often pay for equipment/devices out of their own pockets (Statistics Canada, 2007).

The largest sector of the population likely to benefit from AT use is older people, as aging results in the accumulation of minor physical, cognitive or sensory deficits

(McCreadie, Wright & Tinker, 2006). Therefore, it is very important to consider the increased needs of this population in NL, and to establish essential services to accommodate these rising needs. The use of AT, is seen as a very viable solution in which older adults can use self-care strategies to cope with disability (Freedman, Martin, & Schoeni as cited by Agree et al., 2005).

While the customer satisfaction aspect with various models of service delivery is considered “an important part of the assessment process and can lead to improvements in policy, resource allocation, and strategies for service provision,” little literature is available in this area (Bromley, 1999, p. 40). Reviews of the concepts and frameworks that support modeling of AT are scarce (Wielandt, McKenna, Tooth, & Strong, 2006). So, there is no single model to direct local organizations in successfully finding funding, managing people and AT services, and aligning with local, provincial, and national legislation in the delivery of AT training (Hersh & Johnson, 2008).

There is a general lack of literature available about SEPs and disabilities in Canada and SEPs of any kind in NL. A search of CINAHL, Cochrane Library and PubMed academic databases, and the grey literature (Government of Canada, Industry Canada, ILRC-NL Report), revealed no published studies that have assessed the feasibility of a single entry access system for AT for NL residents. Overall, the academic literature states that “[t]here is a limited to non-existent research base on the effectiveness of AT with a variety of disabilities” (Ofiesh et al., 2002, p. 6). Virtually no cross-disability research has been done to examine the consumer with a disability's perception of AT service delivery in Canada. Among the Atlantic and Maritime Provinces, minimal research has

been conducted on the comprehensive impact of AT devices and services with regard to AT services. Murdoch (2005) investigated women and AT in the workplace in NL and Hill (2007) explored AT for vision and hearing impairments of people across Canada, not including NL. There is value in investigating SEPs as a possible solution to the problem of poor access to AT and AT related information in NL for people with disabilities.

Assumptions and Scope of the Research

My previous and current work and volunteer experience with people with disabilities within NL raised my awareness of AT and the ways in which it can open doors for many people with disabilities. My work throughout the province with post-secondary students, adults and service providers of this population, made the research process more efficient as I was able to connect with community leaders in service provision who are experts in the issues on which I was seeking clarification.

This study will not provide a game plan for how to implement an SEP, but it will provide evidence and support for the need to have improved coordination and availability of AT services in NL. It aims to make a positive contribution to informing government and organizational policies within the province involving AT services and programs.

Research Significance

In Canada, it is twice as common for people with disabilities to live in poverty, compared to Canadians without disabilities (CACL, 2005). As a result, people with disabilities are more likely to be excluded from receiving a quality education, securing gainful employment and being active participants in the community (CACL, 2005). For NL, recent labor market information from Statistics Canada (2007) indicates that:

1. In Canada, people with disabilities earn on average about \$28,503 a year while people without disabilities earn \$37,309 each year. This is much lower in NL, where people with disabilities earn an average income of \$20,428 a year while people without disabilities earn an average income of \$29,419 a year.
2. Approximately 55% of people with disabilities in NL report income levels of less than \$16,000 a year compared to 40% for other Canadians.
3. Even though the employment rate for persons with disabilities in NL is rising, it is significantly lower than that of the average rates across Canada.

There is a large discrepancy in the educational attainment between people with disabilities aged 25-54 in NL and their counterparts living elsewhere in Canada (Statistics Canada, 2007). The largest discrepancy is seen in high school completion which is crucial to attaining higher levels of post-secondary education. Nationally, about 25% of people with disabilities aged 25-54 have completed high school compared to 12% in NL (Statistics Canada, 2007).

The lower levels of education, far higher rates of unemployment, lower earnings and lower household incomes of adults with disabilities in Canada, are determining factors of health (income and education) and will have a significant influence on the utilization of health care. Lower income and a lower educational level limits exposure to formalized instruction in computer technology and general lower economic status presents issues of access to, and affordability of, personalized computer and computer technology (Frieden, 2003). Overcoming access challenges will help support and foster inclusion and equal participation of Newfoundlanders and Labradorians with disabilities. Currently, in NL,

people with disabilities, their caregivers and service providers may be unaware of the multiple advantages that AT provides. Consequently, students, people in the labour market, adults and seniors do not avail of the multiple benefits associated with the use of AT. Therefore, it is important to conduct a study aimed at raising the level of awareness with regard to technology for individuals with disabilities.

There has been a call for more research on access to AT, the level of satisfaction with AT devices, types of training and other concerns needed to enhance service delivery and program development for persons with disabilities (Annable, Goggin, & Stienstra, 2007; Burton, Nieuwenhuijsen, & Epstein, 2008; Hoppestad, 2007). Researchers in the field recommend more quantitative and qualitative research such as surveys to determine the state of AT for the population of consumers and qualitative research to appreciate the perspectives of AT recipients and professionals (e.g. trained educators, rehabilitation specialists, etc) (Hoppestad, 2007). Few studies have focused on identifying barriers and solutions for people with disabilities to meet their specific needs (Butterfield & Ramseur, 2004).

My study on the provision of, and access to, AT in NL uses qualitative and quantitative research methods and concentrates on identifying and recommending solutions for removing barriers. This research may contribute to the development of a coherent strategy to enhance effectiveness and utilization of existing and future programs in the province, related to AT. Determining the current use and need of technology for individuals with special accommodation requirements will highlight trends and issues and provide guidelines for best practices in the field. This information will assist

governments, funding agencies and community organizations by identifying gaps in accessibility and where there may be overlapping services. For health care professionals, consumers, and consumer advocates, this will provide an easier way to navigate the current systems, thereby assisting them in making informed decisions about AT and increasing their awareness of applicable and available technologies for people with disabilities in NL.

There has been considerable interest from government officials and community disability organizations about the results of this study. There is an expectation that it will provide valuable information to a new Disability Policy Office that aims to identify, remove and prevent barriers for people with disabilities. Currently, the only available and valid statistics relevant to disability services in NL, that are commonly cited in Provincial Government reports, comes from the PALS (2006) which does not take into account NL's unique geography and specific needs of each region. In order to develop initiatives that work best in different geographic areas of the province, differences in challenges faced by rural and urban areas must be addressed. My study addressed this by isolating the area of residence and determining satisfaction with AT services and supports in urban regions versus the more isolated and rural areas. Recommendations from this study are expected to enhance the capacity of AT research and inform policy development in the various regions of this province and extend to that of the Atlantic Canada as well.

Thesis Outline

The remainder of the thesis is organized as follows: Chapter 2 provides a literature review of the different issues with regard to defining disability and how some definitions

influence the provision of disability services. It looks at various disability organizations (international, national, and provincial) to assess how each interprets disability and how that interpretation is perceived by the disability community.

Chapter 3 shifts focus to the literature that exists on AT, its definitions, and the range of devices that are available for various disabilities. Further, it examines legislation that exists in the United States to ensure access to AT for people with disabilities. It also highlights the lack of legislation in Canada and the repercussions of this and other barriers related to accessing AT. Also discussed within this chapter is the importance of AT in aging, education, and employment. Finally, it examines the significance of training for a successful outcome for individuals who acquire AT and the need for comprehensive services, systems and policies for AT, with a focus on NL.

Chapter 4 discusses the SEPs that currently exist in home care models and for access to AT aids and devices and provides a basis for assessing the possibilities of components for a similar system in NL.

Chapter 5 explains the methodological framework and approaches used in this study. It also describes the methods such as the consumer survey and key informant interviews employed in collecting and analyzing data. In addition, this chapter includes information on the ethical considerations and challenges faced in conducting research of this nature.

Chapter 6 presents the findings from the surveys with people with disabilities who are (or would like to be) users of AT. It includes socio-demographic information of survey respondents, their satisfaction with AT, how they pay for it, the perceived barriers, their self-assessed health, and how they rated various components of an SEP for AT.

Chapter 7 presents the findings that emerged during the semi-structured interviews with disability service providers. It describes their knowledge in the area of AT, issues they identified with accessing AT services in the province and their own level of training or expertise in the area.

Chapter 8 integrates the information from both the quantitative and qualitative findings. It draws out the themes and also discusses the recommendations and implications that the findings have for people with disabilities, health care and disability service providers, and policy makers in the province. The chapter concludes with recommendations for future research and highlights the main limitations of the study.

Chapter 2: Review of the Literature on Disability Models and Definitions

Disability is not an 'all-or-nothing' matter; the single word, 'disability', is often used to describe many situations (CNDD, 2009). This chapter will focus on defining disability because how disability is defined often determines how the need for disability supports, such as AT, is assessed by funding agencies, governments, and others who determine a consumer's eligibility to receive AT (Hersh & Johnson, 2008). The following text details various models of disability (the biomedical/medical model of disability, the social model, and the human rights model). There has been international attention to defining disability, and many discussions have taken place within Canada about the issues with defining disability.

Disability Models and Paradigms

Models or paradigms of disability help guide "health care professionals' perceptions so that they can serve people with disabilities, enhance their futures, and facilitate the resources they need" (Hubbard, 2004, p. 184). There are several models of disability described in the literature. These models include the biomedical/medical model, the philanthropic model, the social model, the human rights model, the economic model, and the socio-political model (Hersh & Johnson, 2008; Hubbard, 2004). The biomedical/medical model locates disability within the individual, assuming a cure is needed for the individual; The philanthropic or charity model, depicts people with disabilities as victims of circumstance, deserving of pity; The social and human rights models view disability as a consequence of environmental, social and attitudinal barriers that prevent people with impairments from maximum participation in society; and the

economic model defines disability by a person's inability to participate in the work force (Hubbard, 2004). The socio-political model explains that attitudes, economic, legal and policy barriers are the real reasons that people with disabilities have difficulties participating as full members of society (Prince, 2009).

Each of the models listed above lend themselves to various definitions of disability. How AT is defined also tends to vary depending on the model used and depending on whom you consult. Definitions of disability are what really ground a model and how it is identified by a population, for intervention (possibly), and policy. For the purpose of this study, I will limit my discussion to the three conceptual models recognized by the Canadian government (Murdoch, 2005):

1. The Medical Model
2. The Social Model
3. The Human Rights Model

The background and implications of these models and the definitions of disability and assistive technology (AT) are presented in the following sections.

Medical model of disability.

The medical model of disability continues to be prevalent in framing disability in governments, health care, rehabilitations, and psychiatry (Prince, 2009). Critics say that this model tends to present a negative view of the individual with a disability and that it constructs disability as an abnormality within the individual that must be cured or treated by a health professional (Hersh & Johnson, 2008; Hubbard, 2004; Loewen, 2007). The medical model originated with the International Classification of Impairment, Disability

and Handicap (ICIDH) model which was developed by the World Health Organization's (WHO) in 1980 (CNDD, 2009). The ICIDH made a clear distinction between "Impairment", "Disability" and "Handicap" (Chatterji et al., 2002; CNDD, 2009). The words *disability* and *handicap* are often incorrectly assumed to be interchangeable; a *handicap* is an environmental or attitudinal barrier that limits the opportunity for a person to participate fully in society (CNDD, 2009). Negative attitudes or inaccessible entrances to buildings are said to be examples of handicaps (Government of B.C., 2002). The word *handicap* is outdated and has potential to perpetuate negative images of individuals with disabilities.

Proponents say that the medical model, with a focus on impairment and illness, may sometimes be advantageous in raising awareness to health issues for people with disabilities (Pothier & Devlin, 2006). However, critics say that with its focus on limitations rather than an individual's potential, this model often reduces the opportunities for full participation of people with disabilities in Canadian society and limits their participation in the healthcare system (Pothier & Devlin, 2006).

Critics of the medical model stress that advances for people with disabilities cannot be achieved using this model of disability. They say that this model permits excuses by societies and governments that refuse to remove the barriers that keep people with disabilities from succeeding (Pothier & Devlin, 2006). In the hands of professionals who adhere to the medical model, the treatment of people with disabilities can have adverse effects on their emotional well-being, leaving them feeling ashamed, vulnerable and objectified (Marks 1999). Disability, as a label, can function to present an individual to

the public as being “broken” (Christ, 2008, p. 26). This way of treating a disability as a medical diagnosis that requires medical treatment to “normalize” an individual, is being challenged (Hubbard, 2004; Loewen, 2007). A new paradigm would serve to frame disability “in much larger, less conceptually barren and constraining ways than it has been” (Annable et al., 2007, p.145).

Figure 1 illustrates that people with disabilities are passive receivers in the medical model. It shows that external forces (e.g. hospitals, social workers, school systems, etc) act on the “problem,” which is illustrated to be the individual with a disability.



Figure 1: Medical model of disability and its associations

Source: Handicap International (2008).

Social model of disability.

Many in the disability community prefer the use of a social model (Reeve, 2004).

Proponents say that the social (or socio-political) model approach is an example of expanded and improved models (Prince, 2009) that views disability as an interaction between an individual and his/her social environment, and the social practices that

accompany that environment (Gill as cited in Loewen, 2007; Hubbard, 2004; Pothier & Devlin, 2006). The social model does not focus on the underlying medical condition but focuses on the exclusion of those individuals by society (Hoppestad, 2007; Prince, 2009). It originated from the Union of the Physically Impaired against Segregation and was later modified by the Disabled Peoples International, presenting the perspectives of activists and campaigners who have disabilities. The Disabled Peoples International is an international non-governmental organization with headquarters in St. John's, NL.

The social model views disability “as a policy and civil rights issue and not as a health impairment or a diagnosis-related funding issue... [Therefore it] is based on the concept of equal treatment, equal access, equal income” (Hubbard, 2004, p. 185). This model was the driving force behind The Rehabilitation Act of 1973 (the first civil rights law for people with disabilities in America) and also spawned the disability rights movement in the 1970s (Hubbard, 2004). Fundamentally, this movement occurred because people with disabilities want to be seen as people first, to be treated as individuals, to have opportunities to participate in and contribute to society.

The social model is concerned with how society deals with disability (Craddock & McCormack, 2002). It asserts that social, attitudinal, economic, legal and political barriers cause disabling conditions and prevent people with disabilities from full inclusion in society (Disability-Related Policy in Canada, 2007; Hersh & Johnson, 2008; Pothier & Devlin, 2006; Weber, 2006). Instead of focusing on programs to change the individual's situation, the socio-political model of disability “concentrate[s] on altering environmental barriers, changing attitudes and programs that are currently not

succeeding, and advancing the human rights and potential of people with disabilities”

(Disability-Related Policy in Canada, 2007, Overview section, para. 2). Emphasis is on:

1. Design for all (or universal design), which involves designing and constructing devices and environments to be accessible and usable by a wide range of the population without adaptation or specialized design (The Center for Universal Design, 2008)
2. Design of AT systems to help overcome existing environmental and social barriers of people with disabilities (Hersh & Johnson, 2008).

Figure 2 shows that removing barriers (e.g. inaccessible transportation and prejudice or discrimination) for people with disabilities and enabling full inclusion in all aspects of society is a priority in the social model. This model illustrates the problem as being external to the person and occurring within society toward people with disabilities.



Figure 2: Social model of disability and its associations

Source: Handicap International (2008).

Human rights model of disability.

Since the United Nations (UN) Universal Declaration of Human Rights of 1948, the emerging human rights model has included disability. A specific focus on disability rights at the UN level has been maintained since then. In response to the human rights crisis faced by people with disabilities, the UN initiated a number of agreements, statements, world conferences, and other meetings focused on disability rights (Rioux & Carbert, 2003). In 2002, Quinn and Degener submitted a report which evaluated the UN human rights instruments in a disability context:

[T]he human rights perspective means viewing people with disabilities as subjects and not as objects. It entails moving away from viewing people with disabilities as problems toward viewing them as holders of rights. Importantly, it means locating any problems outside the person and especially in the manner in which various economic and social processes accommodate the difference of disability - or not, as the case may be. The debate about rights of [people with disabilities] is therefore connected to a larger debate about the place of difference in society. (p. 1).

Proponents say that the human rights model is a contrast to the medical model in that it "focuses on the inherent dignity of the human being and subsequently, but only if necessary, on the person's medical characteristics" (Quinn & Degener, 2002, p. 10). The individual is at the centre of all decisions affecting him or her, thus transferring the main "problem" from the individual to society (Quinn & Degener, 2002). A human rights approach insists that society, and governments mainly, take measures to ensure that laws and policies are in place to remove barriers, to foster inclusion and guarantee the full

respect for the dignity and equal rights of all persons (Quinn & Degener, 2002; Rioux & Carbert, 2003). The presumption of this approach is that society must accommodate the needs of all people to realize their right to participate and to exercise self-determination as equals in society, by providing “supports, services, and aids to enable social and economic integration, self-determination, and the enjoyment of legal and social rights” (Rioux & Carbert, 2003, p. 2).

The two main elements of this approach are empowerment and accountability. Empowerment “refers to the participation of people with disabilities as active stakeholders, while accountability relates to the duty of public institutions and structures to implement these rights and to justify the quality and quantity of their implementation” (Handicap International, 2008, p.4).

The social model and the human rights may be very similar, but critics say that the social model is often clouded by theoretical analysis (Quinn & Degener, 2002). It works under several premises: the first is that human difference is not innate but is socially constructed and applied through labels (e.g. “the disabled”); the second that these labels are “generally not selected through a neutral or disinterested process”; and the third and most crucial premise is that the “social construct of disability is used not only to *set people apart* but also to *keep people apart*” in areas of education, work, family or social interaction (Quinn & Degener, 2002, p.10). In comparison, the goal of the human rights model is to build “societies that are genuinely inclusive, societies that value difference and respect the dignity and equality of all human beings, regardless of difference. . . It

has been described as the 'next generation' civil rights movement" (Quinn & Degener, 2002, p.10). The human rights model in Figure 3, appears to be very dialectical.



Figure 3: The rights-based model of disability and its associations

Source: Handicap International (2008).

International Attention to a Definition of Disability

The struggle over definitions and categories for what constitutes a disability is important, especially in a historical context (Pothier & Devlin, 2006; Hersh & Johnson, 2008).

Internationally, organizations such as the UN, the WHO, and Disabled Peoples' International have been struggling for years with the concept of a definition for disabilities.

Disability activism, which began in the 1950s-60s, proceeded to lead to the Universal Declaration of the Rights of Persons with Disability in 1990. In 1994, standard rules on the Equalisation of Opportunities for Persons with Disability were developed. The Americans with Disabilities Act (ADA) of 1990 has contributed a great deal to the provision of services and supports to many in the disability community across North

America (Hopkins, 2004). In 2006, the UN Convention on the Rights of Persons with Disabilities (CRPD) and its Optional Protocol was adopted. The CRPD is an international human rights treaty of the UN which sets out the legal obligations on States to promote and protect the rights of persons with disabilities (UN Enable, 2007). The CRPD is both a development and a human rights instrument, a policy instrument which is cross-disability and cross-sectoral and it is legally binding.

The current draft of the UN CRPD does not explicitly define “disability” nor does it define people with disabilities. The language they use is that “[p]ersons with disabilities include [people] who have long-term physical, mental, intellectual, or sensory impairments which, in interaction with various attitudinal and environmental barriers, hinders their full and effective participation in society on an equal basis with others” (UN Enable, 2007, Article 1).

In 2001, the WHO moved toward a new international classification system, the International Classification of Functioning, Disability and Health (ICF 2001). In May 2009, The WHO Disability and Rehabilitation Department verified the new ICF definition of disability as:

... a difficulty in functioning at the body, person or societal levels, in one or more life domains, as experienced by an individual with a health condition in interaction with environmental factors. (Leonardi et al., 2006, p. 1220)

This new definition has several components, including impairments, activity limitations and participation restrictions (Chatterji et al., 2002; WHO, 2001). It is based

on the social model, focusing on the interaction between a person with a disability and the environment and emphasizing functional status over diagnoses (WHO, 2001).

Although this updated version considers disability to result from an interaction between an individual's health and contextual factors, some people still believe that it still more heavily emphasizes factors related to the individual and not the external environment (Hersh & Johnson, 2008).

In 2005, Disabled Peoples' International accepted the ICF definition of disability as the outcome of the interaction between a person with impairment and the environmental and attitudinal barriers he or she may face. However, this is expected to change and Disabled Peoples' International will soon be adhering to the UN CRPD definition as it places less emphasis on the individual than the ICF definition does, and it is a more fluid definition (M. Ennis, personal communication, July 5, 2009).

Definitions of Disability in Canada and NL

The various definitions of disability inform how Canadians define a "person with a disability" and how persons with disabilities perceive themselves. Finding one general definition of disability that fits all intents and purposes across Canada's jurisdictions has been challenging. This is because the definitions of disability from the social and human rights perspective at the federal, provincial, and territorial levels are broader than those used for entitlement to programs providing income support benefits (ODI, 2004).

The Government of Canada bases eligibility criteria for income support programs and tax measures on the medical approach, and places emphasis on functional limitations (ODI, 2004). For example, the Service Canada Student Loans Program offers non-

repayable Canada Study Grants for students with particular needs, including students with permanent disabilities. The CSLP define a permanent disability as “a functional limitation caused by a physical or mental impairment that restricts the ability of a person to perform the daily activities necessary to participate in studies at a post-secondary level or the labour force and is expected to remain with the person for the person's expected natural life” (ODI, 2004, p.35). To claim entitlement for such a grant, a person would have to provide medically certified documentation regarding the type and severity of disability, which is assessed in terms of impairment resulting in a functional limitation. For this reason, disability-related income support, and tax relief are not available to everyone who identifies with a disability.

Leonardi and colleagues (2006) argue that having agreement on the definition of disability is the first step toward defining health and social policy for people with disabilities. They assert that the definition should allow comparison of severity across different types of disability, be flexible for different applications (e.g. statistical or clinical use), be able to describe all types of disability, recognize the effects of the environment, be clear and take into account the length of time that personal function may be limited (Leonardi et al., 2006; Stewart, 2002). If the disability is long-term, a different, longer time period should be required for re-assessment with additional support and services available to persons with multiple disabilities (Stewart, 2002). Meanwhile, other sources believe that no one definition will, or should, be applied and consider the definition of disability to be an evolving concept, fluid and capable of changing over time (ODI, 2003; UN Enable, 2007).

In 2002, on the recommendation of the House of Commons Subcommittee on the Status of Persons with Disabilities, work began on a document to define disability. Based on committee recommendations, a report called *Defining Disability* (2003) presented the views of disability advocates, academics, mental health representatives, and medical professionals on establishing a definition. Government and community agencies called for greater consistency of interpretation, but the general consensus was that 'disability' cannot be defined in *absolute*, all-inclusive terms. The report stated the complexity of issues involved:

One definition of disability that fits all circumstances may not be possible or even desirable. Disability is difficult to define because it is a multi-dimensional concept with both objective and subjective characteristics. When interpreted as an illness or impairment, disability is seen as fixed in an individual's body or mind. When interpreted as a social construct, disability is seen in terms of social, economic or cultural disadvantages resulting from discrimination or exclusion. (ODI, 2003, p. 39)

The issue of the provision of disability services in NL is compounded by the fact that there is no one accepted definition of disability within Canada (ODI, 2004). Within NL, organizations such as the Coalition of People with Disabilities of NL and the Disability Policy Office of the Government of NL have adopted the language of the UN promote the Human Rights Model. Disability organizations in NL such as the ILRC do not regard it as desirable to define disability.

Participation and Activity Limitation Survey (PALS).

The Participation and Activity Limitation Survey (PALS) is funded through Human Resources and Social Development Canada (HRSDC) and administered by Statistics Canada. It seeks to assist social policy development and support disability-related research by providing essential information on the prevalence of different disabilities of Canadians, the type and severity of activity limitations and the type of difficulties and barriers that may be experienced by people with disabilities. It also details costs incurred for AT, it lists aids and AT that people say they need but do not have, and it gives information about people's average income and participation in social activities (Statistics Canada, 2007). The most recent PALS survey was administered nationwide in 2006 and its survey questions allowed the identification of various types of disabilities (see Table 1).

PALS defined disability as "an activity limitation or participation restriction associated with a physical or mental condition or health problem" (Statistics Canada, 2007). This definition encompasses both the medical and the social model of disability, as it relates disability to body structures and functions, daily activities and social participation, and also recognizes the role of environmental factors. It is highly regarded in the literature for being a good standard for defining disability (Pothier & Devlin, 2006, p. 27).

For individuals completing the PALS survey, Table 1 would be presented as a means for self reporting a disability, if not already diagnosed. However, it does not always take into consideration the role of environmental factors. Nor does it provide a comprehensive

Table 1

Types of disability among adults and children as defined by PALS (2006).

Hearing	Difficulty hearing what is being said in a conversation with one other person, in a conversation with three or more persons, or in a telephone conversation.
Seeing	Difficulty seeing ordinary newsprint or clearly seeing someone's face from 4 metres away (12 feet).
Communication	Difficulty speaking and / or being understood.
Mobility	Difficulty walking half a kilometre or up and down a flight of stairs, about 12 steps without resting, moving from one room to another, carrying an object of 5 kg (10 pounds) for 10 metres (30 feet) or standing for long periods.
Agility	Difficulty bending, dressing and undressing oneself, getting into or out of bed, cutting own toenails, using fingers to grasp or handling objects, reaching in any direction (for example, above one's head) or cutting own food.
Pain*	Limited in the amount or kind of activities that one can do because of a long-term pain that is constant or reoccurs from time to time (for example, recurrent back pain).
Learning	Difficulty learning because of a condition, such as attention problems, hyperactivity or dyslexia.
Other	Respondents from any disability type could report any other assistive device needs or usage in this section.

* Applicable only to adult respondents

Source: Statistics Canada (2008b)

description of all disabilities in that list. For example, learning disabilities (LDs) are described so that the onus of the disability is placed on the individual's "condition" and attention "problems." Actually, the prominence of attention difficulties for someone with an LD is also due to inadequate accommodations to their specific attention needs.

Summary

This chapter covered the governing concepts related to disability and explored the models that frame how disability may be defined and the potential impact of the definition approach. Defining disability is a complex issue and a consensus on a definition has not been reached. Although some believe it is important to have consensus, it does not appear that one will be reached. Disability models vary and help to define the way in which disability is perceived. Models also provide a reference for decision makers who create laws, regulations and structures that impact the lives of people with disabilities. The three main models that have influenced modern thinking about disability are the medical, social and human rights models. Table 2 provides a summary comparison of the three models by definition, approach to disability, goal of the model, where onus is placed, the remedy (change that needs to take place), and agent of remedy (who makes that change).

Table 2

Comparing the Medical, Social, and Human Rights Models of Disability

	Type of Model		
	Medical Model	Social Model	Human Rights Model
Definition of Disability	Medical problem that needs to be solved or 'cured'.	Interaction between the individual and society.	Element of national human diversity, on the same basis as race or gender.
Approach to disability	A disability is negative.	A disability, in itself, is neutral.	A disability does not reduce a person's entitlement to his/her societal rights.
Goal	Change people with disabilities so they can perform more efficiently in a society.	Eliminate societal and physical barriers by promoting positive attitudes/perceptions, modifying the built environment, providing accessible information, etc.	Equality for all citizens, including people with disabilities. Two main elements are empowerment and accountability.
Onus	On the individual.	Upon society and not the individual.	On society and government.
Remedy	Cure or normalization of the individual.	A change in the interaction between the individual and society.	Laws and policies for full participation/non-discrimination of people with disabilities.
Agent of remedy	Health professional.	Individual, advocate, etc who affects arrangements between the person and society.	Society and governments.

Source: CNDD (2009)

Chapter 3: Review of Literature on AT

Being knowledgeable about what AT is and how it is defined makes a difference to how services are delivered to people with disabilities. This chapter begins with an overview of what AT is and which types of technologies are appropriate for various forms of disability. It then covers a review of the literature on AT, detailing the benefits of AT, issues of legislation and regulation of services including AT availability and access, technology assessment (matching person to technology), AT training, barriers to acquisition of AT and AT services, and finally policies and programs in Canada and in NL specifically, that are related to AT.

What is AT?

Although there is no universally accepted definition of “assistive technology,” the literature states that AT devices and services encompass a wide range of such specialized support to improve quality of life and allow independence in daily living for people with disabilities (Hersh & Johnson, 2008; Pettersson, Appelros, & Ahlstrom, 2007; Scherer, 2005a). The Federal Government of Canada uses US legislation provided through the US Technology-Related Assistance for Individuals with Disabilities Act (1988) which defines AT as:

Any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities. AT service is directly assisting an individual with a disability in the selection, acquisition, or

use of an assistive technology device. (Section 3.1. Public Law 100-407, 1988 - renewed in 1998 in the Clinton Assistive Technology Act)

Some sources assert that this definition is influenced more by the medical model of disability, because “the focus is on rehabilitation and specifying the AT that are eligible for funding rather than a wider range of applications” (Johnson & Hersh, 2008, p. 195). Therefore, Johnson and Hersh (2008) proposed that the social model, with its stress on overcoming barriers and design for everyone, was more appropriate as a basis for defining AT. As a result, existing definitions of AT were examined and Johnson and Hersh (2008) developed the following definition based on the social model of disability:

Assistive technology is a generic or umbrella term that covers technologies, equipment, devices, apparatus, services, systems, processes and environmental modifications used by disabled and/or elderly people to overcome the social, infrastructural and other barriers to independence, full participation in society and carrying out activities safely and easily. (p. 196)

However, the US Technology-Related Assistance for Individuals with Disabilities Act (1988) definition of AT is more widely used in Canada, by Industry Canada and national organizations like the Learning Disabilities Association of Canada (LDAC).

There is a wide range of AT products available from “low tech” (such as magnifying lenses, walking sticks, jar openers and tap turners, colored coding systems) to “high tech” (such as AT computer software, powered mobility devices, modified keyboards, voice recognition programs) instruments (ACT, 2009; Craddock, 2006; Hopkins, 2004; Scherer, 2005b). The low tech devices are generally inexpensive, and easy to use, while

the high tech options are more costly and require significantly more training (DeJonge & Rodger, 2006). Magnifying lenses, index cards, and timed alarm clocks are simple devices that can promote independence and improve an individual's quality of life, just as more complex ones (e.g. a speech recognition software program) can.

The usefulness of the technologies for specific disabilities – some are listed in Table 3 - is based on the US Department of Commerce (2008) report and the results of the PALS 2006 survey. This survey identified the following categories as the most common types of disabilities, among a surveyed population of 48,000 (9,000 children and 39,000 adults) (Statistics Canada, 2007).

Benefits of AT

For most people, technology makes completing daily activities more efficient. For many persons with disabilities, technology makes things possible (Christ, 2008; Gordon, 2006; TBCS, 2004). Technology can be liberating because it provides increased access to information. For example, Stienstra, Watzke, and Birch (2007) found that:

for people who are blind or visually impaired, screen-reading technology makes inaccessible print documents accessible. For Deaf people, text messaging has provided an accessible communications tool that removes many of the barriers of oral communications. The Internet, for those who can access it, can create online support communities for those living in isolated settings (p. 151).

Table 3

Types of AT suitable for various types of disabilities

Type of Disability	Appropriate AT
Mobility (e.g. limited hand movement)	Switch activation and scanning software, controlling devices in the environment by spoken commands, speech recognition software, touch pads and touch screens, onscreen and alternative keyboards, adapted head mouse, foot mouse, joystick, and sip and puff activation technologies.
Communication/speech disabilities	Low-tech symbol and picture boards, electronic pocket wallets, and high-tech handheld devices equipped with augmentative and alternative communication software.
Hearing disabilities	Interpreters, preferential seating, and visual cues; Depending on the severity of their condition, people with hearing loss may require listening AT devices (ATDs) such as hearing aids, personal FM systems, and speech recognition programs to translate an instructor's voice to text and sign language on a computer screen.
Vision disabilities	Text-to-speech software (also known as voice recognition software), and screen magnification software (or augmentative communication software), or other magnification technology such as closed circuit television (CCTV). Blind people may require computer-based screen reading technologies and Braille output technologies to access digital text.
Developmental disorder (e.g. speech)	Articulation expressive language software, academic programs to address reading, writing and/or arithmetic disorders.
Learning Disabilities	AT software to address reading, writing and/or arithmetic disorders (text-to-speech and speech-to-text software).

AT is included in the category of disability supports which refers to a range of goods, services and supports tailored to the individual requirements for daily living (e.g. respite care, technical aids and devices; special equipment; homemaker, attendant or interpreter services; life skills; physiotherapy and occupational therapy). These goods, services and supports are essential for active participation at home, at school and in the community and are a key component of maximizing personal and economic independence (Social Union, n.d.). Reports show that students with disabilities in Canada especially need technologies that will allow them to prepare and participate in the knowledge-based economy of tomorrow (US Department of Commerce, 2008; Statistics Canada, 2007).

Gamble, Dowler, and Orslene (2006) presented a review of relevant literature on the use of AT in the workplace and they identified findings from a national study stating that for adults who are seeking employment, having low cost and low tech devices can often make the difference between having and not having a job. Butterfield and Ramseur (2004) identified nineteen individual case studies and 11 multi-subject studies within their literature search and similarly found that AT in the workplace enables people with disabilities to maintain employment.

The use of AT is of critical importance to promoting the full participation of individuals with disabilities in everyday activities by reducing the impact of barriers and activity limitations and enhancing functional independence (Statistics Canada, 2008a; Vincent, 2000). AT is considered to be an environmental factor in the determinants of health; Environmental factors are an important part of describing the concept of disability

with the potential to facilitate health and restore functioning (Scherer, 2005a; Weber, 2006).

AT Legislation

As previously stated, the United States (US) is ahead of Canada in terms of its legislation regarding access to AT for people with disabilities. The Technology-Related Assistance for Individuals with Disabilities Act (1988) was closely followed in 1990 by the Americans with Disabilities Act and the Individuals with Disabilities Education Act. Under the Individuals with Disabilities Education Act, all students on an Individual Education Program must be considered for AT (Scherer, 2005b). This Act, along with the Americans with Disabilities Act and the Rehabilitation Act (Section 504), is part of a national strategy that strives to provide special needs students with a free, appropriate public education in the least restrictive environment possible (Hopkins, 2004). Further legislation increased attention to the benefits of AT. In 1998, US Congress amended the Rehabilitation Act to require Federal agencies to abide by Section 508 and make their electronic and information technology accessible to people with disabilities (Section 508, 2008).

The Individuals with Disabilities Education Act Amendments of 1997, the AT Technology Act of 1998 and the New Freedom Initiative further enhanced access to, and the availability of, AT for people with disabilities. The New Freedom Initiative significantly increased funding for low-interest loans to allow more Americans with disabilities to purchase AT. In 2001, the Centers for Medicare and Medicaid Services

formally defined Augmentative and Alternative Communication devices as a Medicare benefit (Scherer, 2005b).

In Canada, there are no comparable legislative laws to ensure access for adults with disabilities. Industry Canada (2008) clearly states on their website that “[i]n the absence of national Canadian standards for accessibility related to many types of products, the only alternative might be to use the US Section 508 standards.” Federal legislation and funding in the US have fostered awareness among politicians, educators, advocates, families, and others of the value of AT in education, lifelong learning, career advancement, and the societal inclusion of people with disabilities (Hopkins, 2004). The current lack of Canadian legislation regarding AT may contribute to confusion for both individuals with disabilities and for organizations providing disability services as to what AT is, and ultimately how it can benefit the millions of Canadians with disabilities. Currently, Alberta, Saskatchewan, Ontario, Quebec, and Prince Edward Island provide support and comprehensive funding for such services. This situation does not compare favorably with the Assistive Technology Acts in the US which ensures provision of funding to develop statewide, consumer-responsive information, training and technical assistance programs designed to meet the AT needs of individuals with disabilities of all ages (Ofiesh et al., 2002; Strobel, Rossa, Arthanat, & Brace, 2006).

In October 1997, the Government of Canada did, however, introduce an amendment to the *Canadian Human Rights Act* to include the duty to accommodate (Social Union, n.d.). The duty to accommodate requires that employers and unions in Canada make every reasonable effort, short of undue hardship, to accommodate an employee, by

eliminating or changing rules, policies, practices and behaviours that discriminate against persons based on a group characteristic such as disability² (Government of Canada, 2004).

Currently, the US has more highly developed AT service models than exist in other countries (Hopkins, 2004). Each state has a Tech Act project that has been funded through the AT Act of 1998 and a National Information System for Assistive Technology “to provide timely and accurate collection, analysis, and reporting of data relating to the activities of the 56 State Assistive Technology Programs” (NISAT, n.d., homepage, para. 1). Countries like Canada, Sweden, and the UK have adopted American terminology relating to AT.

Accessing AT and Supports

Hoppestad (2007) conducted a study in which he sought to provide a review of the contemporary literature regarding computer access for persons with severe and multiple disabilities using AT. Databases including the Educational Resources Information Center (ERIC) and the US National Institutes of Health (PubMed) were accessed by Hoppestad for information in scholarly journals and for Web Postings. The Coleman Institute's Assistive Technology Literature Database which provides a comprehensive listing of AT Journals was also utilized, and each of the Websites of these journals was accessed and searched. Search engines on the web including Google Scholar, Altavista, Infomine, and

² The Canadian Human Rights Act goes beyond disability to include other group characteristics, such as race, national or ethnic origin, colour, religion, age, sex (including pregnancy), sexual orientation, marital status, and family status.

Scirus were utilized as well. Hoppestad found that people with disabilities are typically underserved in the area of AT (Hoppestad, 2007).

Although some progress has been made in Canada toward increased access and full inclusion for people with disabilities, especially in the areas of education and employment (HRSDC, 2006), there are still deficiencies. Evidence from Canadian survey data indicates that many individuals do not have the technology that they require. Such evidence includes PALS (2006) findings that 4.2 million Canadian adults over the age of 15 experience some form of disability and 2.7 million (63%) of this total used or needed AT to help perform one or more daily activities (Statistics Canada, 2008b). Of the 2.7 million people who used AT, six out of ten reported having all the equipment they needed (i.e. all needs were met), while three out of ten used such equipment but needed more aids (i.e. some needs met), and one out of ten had none of the equipment required.

PALS (2006) also revealed that people with severe disabilities are less likely to have their AT needs met (41.3%) than those with mild disabilities (75.9%) (Statistics Canada, 2008c). The price of AT for people with various disabilities ranges from \$20 for a white cane to \$18,708 for an electronic Braille display system (Government of Canada, 2005). PALS (2006) revealed that most adults with disabilities paid for the AT devices themselves, and in some cases the costs amounted to tens of thousands of dollars.

As part of the Canada Health Act, Newfoundlanders and Labradorians, like residents of other Canadian provinces, have access to basic publicly-funded health care. Benefits that are in addition to that, such as access to AT, are identified and administered by the individual provinces and territories (Ripat & Booth, 2005). In NL, there is no one

department or private agency to administer services related to AT, and similar to other provinces, the result is “a complex system of service delivery where each department or agency establishes its own system and criteria for funding and delivering AT” (Ripat & Booth, 2005, p. 1462).

The Canadian government has a duty to uphold the four guiding principles (autonomy, beneficence, non-maleficence and justice) that are commonly accepted principles of health care ethics (Health Canada, 2007; Vincent, 2000). The ethical responsibility to promote a sense of autonomy among people with disabilities is especially important (Health Canada, 2007). People with disabilities have a right to make their own decisions based on full information, and in order to be autonomous, they need to have the opportunity to benefit from the resources Canadian society makes available to its citizens (Disability, Community and Society as cited in CCD, 2008). It is often cited in the literature and in anecdotal statements, that to be denied proper AT resources obstructs full inclusion of people with disabilities into society.

Positive associations have been identified between availability of government funding and acquisition of disability-related supports (Bartram & Jeffrey, 2004). However, the voluntary sector organizations often provides supports and services for people with disabilities and these organizations “are funded inconsistently due to lack of a regulatory system” (O’Reilly, 2007, p. 117). There is a great deal of variation among disability organizations in terms of both how they work with technology and where they identify openings and barriers in technology; However, they all acknowledge that when barriers are reduced, the potential for technology to liberate people with disabilities is improved

(Stienstra et al., 2007). Organizations that work within a human rights perspective aim to identify and address ways in which the development and use of technology excludes or marginalizes people with all types of disabilities as well as the specific ways certain people with disabilities encounter these barriers (D'Aubin, 2007). Consequently, these organizations spread advocacy around the promotion and development of technology using universal design principles as well as regulatory mechanisms for the development and use of IT, including the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines, often directing recommendations to government bodies (Stienstra et al. 2007).

Matching Person to Technology

Gaining access to AT is insufficient alone. Therefore, "the key to AT utility is not merely its simplicity and availability, however, but the extent to which it meets a user's personal needs" (Scherer, 2005a, p. 733). When examining AT needs for the user, effective decision-making is recommended with a team approach (Copley & Ziviani, 2005; Pettersson et al., 2007). This approach involves the considerations/priorities of the individual with a disability and the individual's family, contributions of all educational team members and technical support from AT experts once a specific need is identified (Copley & Ziviani, 2005; Johnston, Reichle, & Evans, 2004).

Acquiring AT requires the involvement of the prospective AT user, so that their skills, abilities, supports, resources, needs, and wants are addressed which helps to create a "contextual fit" (Johnston et al., 2004). In a qualitative study by Petterson et al. (2007) with 22 post-stroke individuals in Sweden, it was found that AT consumers would have

preferred to be more involved in the prescription process. Furthermore, they sometimes had to convince the prescriber that they needed a particular device, and other times, they felt that the prescriber doubted that there was a need for the individual to have AT.

Gamble, Dowler, and Orslene (2006) presented a review of relevant literature on the use of AT in the workplace and described a 6-step model for appropriate AT selection to be used by rehabilitation counselors which includes: 1) defining the situation, 2) identifying available resources, 3) exploring appropriate AT, 4) AT in vocational assessment, 5) AT and job readiness, and 6) AT in employment.

A significant amount of time is required for an individual to achieve a successful outcome with AT (Craddock, 2006). This, combined with the difficulty in obtaining the AT, makes for a lengthy process (Fichten, Barile & Asuncion, 1999). A better match of AT and user would lead to a more effective use of limited funds and personnel resources for the increasing number of clients with diverse needs (Copley & Ziviani, 2005). The Matching Person to Technology (MPT) model developed by the Institute for Matching Person and Technology is a means to assist professionals in selecting appropriate AT for individuals with disabilities (Scherer, 2005a). The model considers these components: the person using the technology, the technology being used, and the environment it is been used in. This MPT model will be explained further in Chapter 4.

Rationale for Implementing AT

Importance of AT in education and employment.

The unemployment rate for people with disabilities in Newfoundland and Labrador is 24.8%, which is more than 5 percentage points higher than the population of people

without disabilities in this province (Statistics Canada, 2007). AT can improve access and inclusion for people with disabilities, especially in education and employment (Human Resources and Development Canada, 2008). Hopkins (2004) identified a number of aspects surrounding AT, including:

1. rationale for implementing AT
2. resources to support students
3. successful implementation (assessing student need, evaluation and follow up) and
4. an online directory

Hopkins (2004) strongly asserts that AT is increasingly being provided in the kindergarten to grade 12 (K-12) school systems, public libraries, postsecondary, and employment settings within Canada, providing new options for individuals with disabilities to participate in society and accomplish tasks. She advocates that AT resources supports the acquisition of valuable transitional skills to help enable the achievement of postsecondary and vocational goals, by helping many students “access information, connect with others, and participate in their communities in ways that would not be possible without AT” (Hopkins, 2004, p. 2). Craddock’s (2006) mixed- method investigation of 45 post secondary students with disabilities in Ireland found that successful postsecondary education for students with disabilities results in a more productive and fulfilling life, financial success, and improved vocational options. Butterfield and Ramseur (2004) conducted an extensive literature review on workplace accommodations including provisions for AT and they identified that accommodations

for people with disabilities, especially AT, are vital to success in both gaining and sustaining employment.

AT policy, funding, and educator training are key issues for Canadian education leaders. Preparing Canadian educators and schools to deliver AT and services to students with disabilities requires systematic support and commitment (Hopkins, 2004). Research shows that post secondary institutions and their faculty do not always consider the access needs of learners with various disabilities and that “the potential benefits of AT can be limited by inadequate training of educational staff” (Copley & Ziviani, 2005, p. 559; Fichten, Nguyen, Barile, & Asuncion, 2007). In general, Canadian educators do not know much about AT for persons with disabilities, but it is very important for them to use enabling technologies that allow all students to reach their potential (Hopkins, 2004).

Ensuring that an AT initiative receives widespread support requires multiple stakeholder (ministry, educator, parent, and student) awareness (Hopkins, 2004). Ideally, it is desirable to educate representatives from all of these interests about the educational applications of AT. AT support services are important for both educators and students. Educators need resources and personnel; Students require ongoing support (Craddock, 2006). Software and systems compatibility issues affect AT functionality. Educators must be aware of the expanding array of AT options available and system requirements for the products they are interested in acquiring (Hopkins, 2004). To ensure success of AT intervention, consideration and ongoing evaluation of student development and learning requirements are needed to ensure that individual student's AT needs are being met appropriately (Christ, 2008; Hopkins, 2004; Ofiesh et al., 2002).

Importance of AT for an aging population.

Agree et al., (2005) analyzed a national sample of older persons with difficulty in activities of daily living and showed that AT has considerable value for achieving physical, personal and social outcomes in the aging populations and decreasing reliance on personal care. It is speculated that the recent increase in the use of AT can improve quality of life for the aged and reduce pressures on the current long-term care system (Agree et al., 2005).

McCreadie, Wright and Tinker (2006) mapped AT and information sources, and conducted focus groups with 28 users aged 75 and over and 12 carers, interviews with 40 professionals and information providers and a postal questionnaire to 131 care home managers. The findings indicate that the aging population as a growing sector is most likely to benefit from using AT. There is a large volume of available information on AT, but McCreadie et al., (2006) suggest that there are problems in identifying needs and in accessing all necessary information about AT and how it can be acquired and used successfully.

Research has shown that AT is commonly used by people with a residual disability after stroke (e.g. for hygiene-related activities, mobility and transfers) (Pettersson et al., 2007). The qualitative study by Pettersson et al., (2007) with post-stroke individuals in Sweden about their daily experiences using AT found that AT was viewed as a prerequisite for well-being, independence, and the performance of daily activities. The authors also found that personal, physical and psychosocial implications of using AT in

early rehabilitation involves topics such as adaptation between the device and the body, dilemmas of social identity and of cultural values (Pettersson et al., 2007).

Findings from these studies clearly highlight the importance of AT for the aging population. Individualized and holistic device screening and training approaches would be well suited for this population of current and potential AT users. Older people know their needs best and frequent consultation is needed between policy makers and this population to ensure appropriate services are established to help maintain their independence in aging (McCreadie et al., 2006).

Barriers to Acquiring AT

Compared to people without disabilities, people with disabilities face additional barriers in accessing AT technology, including a range of physical, attitudinal, normative, perceptual, access or technological barriers in policy or in practice (Aminzadeh & Edwards, 1998; Gallant, 2006; Pettersson et al., 2007). A US report on Canadian requirements for AT for students with disabilities supports the fact that the educational programs of Canadian provinces are generally well funded and up to date for students at the K-12 level; However, there is often insufficient funding to cover costs beyond basic tuition and textbooks for post secondary students (US Department of Commerce, 2008). The literature highlights that the most commonly cited barriers to acquisition of, and progress related to AT, include lack of knowledge and comprehensive policy, inadequate training and cost (DeJonge & Rodger, 2006; Fichten, Barile & Asuncion, 1999; McCreadie et al., 2006; Peterson, & Murray, 2006; Statistics Canada, 2008c; Stienstra et al., 2007).

DeJonge and Rodger (2006) explored the experiences of 26 AT users with a range of physical disabilities as they used their AT in the workplace. Participants identified many factors that restricted their use of technology such as limited knowledge about the AT, the amount of time required for training, limited work time available for mastery, cost of training and limitations of the training provided.

Fichten, Barile and Asuncion (1999) conducted a series of four bilingual focus groups with 31 individuals in Montreal, Canada to investigate AT needs and concerns of postsecondary students with disabilities. Focus groups included postsecondary students with various disabilities; college and university personnel responsible for providing services to students with disabilities; professors; and academics, computer specialists, and other concerned individuals. The researchers found that the high cost of acquiring and maintaining computer technologies was the single most important and common issue noted by computer users and non-users alike, the majority of students who had computer equipment at home indicated that they or their families had paid for it, and most students did not know about the existence of a government program that would help them obtain computers or other adaptive technologies.

In a different study, Fichten, Asuncion and Barile (2001) investigated the views and concerns about computer and adaptive computer technologies of postsecondary disability service providers. Structured interviews with 156 Canadians who provide disability related services to students were carried out in the spring 2000. Participants identified several barriers to providing AT services to students, including inadequate availability of adaptive computer technologies in general use computer labs, poor technical support for

adapted computer technologies, inaccessibility of computer based teaching materials, lack of awareness of faculty about computer related needs of students with disabilities, few opportunities to learn about computer technologies, and inadequate training by community agencies for students using adaptive technologies.

Scherer (2005a) critically appraised prior research and conducted a literature review in which she identified the critical needs for an assessment process to ensure the successful use of AT and other supports by persons with cognitive disabilities. She highlighted that a lack of trained personnel to assist in choosing and obtaining AT constitutes an environmental barrier within the social environment (as do policies that set a low priority on resource allocation for AT). The failure of a service provider to require that personnel conduct a comprehensive assessment of consumer needs, priorities and AT preferences at the beginning of the AT and support selection process is also a barrier.

In addition to increasing access to information, technology may also create new or additional barriers to accessing information and the benefits of living in an information society (Stienstra et al., 2007). Gallant (2006) wrote, that “access to computer technology unlocks a world of knowledge and information which, without access to AT support, would remain closed to many persons with disabilities” (p. 24). Access to internet is more critical for people with disabilities but there is often a disadvantage associated with the ‘digital divide’ – which means a gap between those able to benefit from technologies and those who cannot, splitting regions, countries and society (Weber, 2006). People who need AT to access mainstream IT “often cannot afford to buy these technologies, or acquire new versions to keep pace with the changing mainstream IT environment (e.g.,

operating systems and other software with which adaptive technology interacts)” (Stienstra et al., 2007, p. 151). Facilitating factors related to AT acquisition include consultation with a knowledgeable health care professional and government programs (Hoppestad, 2007).

Income Levels

PALS (2006) found that, despite a growing employment rate in NL, the labour force participation rate for people with disabilities in the province is quite low. Of the 43,250 people with disabilities in the province who could have potentially participated in the labour force, 60% (or 25,730 people) were not in the paid labour force. Approximately 55% of individuals with disabilities in NL have a total annual income of less than \$16,000, whereas on the national level, about 40% of people with disabilities make less than this amount (Statistics Canada, 2007). Given the employment situation for people with disabilities, it is not surprising that people with disabilities have lower income levels than people without disabilities. PALS data indicated that in Newfoundland and Labrador in 2006, the average income for adults over age 15 with disabilities was \$20,428, compared to \$29,419 for people without disabilities (see Figure 4). The Canadian average income for people with disabilities was higher at \$28,503, compared to \$37,309 for those without disabilities.

In NL, only 30.2% of individuals have some of their needs met (see Table 4). A large majority of these individuals are likely hesitant to spend significant portions of their income on products with uncertain benefits.

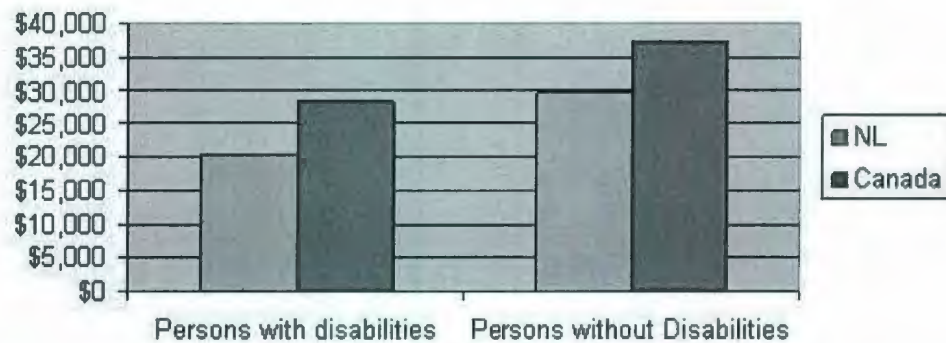


Figure 4: Average annual income for people with disabilities over age 15, Canada and NL 2006.

Note: Figure adapted from PALS by Statistics Canada, 2007.

Table 4

Adult Population with Disabilities, by Use of Need for Specialized Equipment or Aids in NL, Canada, 2006

Province	<u>No needs met</u>	<u>Some needs met</u>	<u>All needs met</u>	<u>Total</u>
	N (%)	N (%)	N (%)	N
Newfoundland and Labrador	4,290 (9.4)	13,790 (30.2)	27,620 (60.4)	45,710

Note: Adapted from PALS by Statistics Canada, 2007.

Technology Abandonment

Many who obtain AT do not gain the full benefits of the products due to lack of training or incorrect use, or worse, they abandon products entirely (Dejonge & Rodger, 2006).

Research shows that approximately 30% of AT devices are abandoned within a year

(Scherer, Sax, Vanbiervliet, Cushman, & Scherer, 2005). For particular devices, the incidence of abandonment can extend to 75% (Scherer, 2005b). Some of the top reasons cited in the literature for abandoning AT include inaccurate assessment of the consumers' needs and preferences, and a limited availability of skilled AT providers, services and support (Craddock, 2006; Dejonge & Rodger, 2006; Scherer, 2005a, 2005b). The abandonment of an AT device extends into various aspects of an individual's life: "Not only does abandonment mean a loss of potential, freedom and independence, it leads to disillusionment with both technology and the adoption process" (Kintsch & DePaula, 2002, p. 2). Abandonment of AT can also have financial implications for families, who use their own monies to purchase costly devices and equipment.

Dejonge and Rodger (2006) identified that several key strategies to increasing AT use include tailored training and learning support as well as opportunities to practice using the technology and exploring its features away from work demands. Hoppestad (2007) found extensive reasons cited for underutilization of AT including prejudicial views towards persons with disabilities, inadequate assessments, lack of a person-centered approach, and methods for practice that are not evidence based.

User satisfaction helps to lower rates of product abandonment. Study results show that age and having access to a regular contact person were the most significant factors in determining user satisfaction and reducing product abandonment (Sund, 2008). Jedeloo, DeWitte, Linssen and Schrijvers (2002) conducted a study in the Netherlands in which they surveyed a random sample of 973 adult users from three local authorities. Client satisfaction with the service delivery process was measured using seven items added to

the 12 items of the Quebec User Evaluation of Satisfaction with assistive Technology instrument (QUEST) 2.0 scale (Demers, Weiss-Lambrou, & Ska, 2000) (see Chapter 5 for further description of the QUEST 2.0 scale). Demographic, health status and service delivery outcome characteristics were also measured. Differences in clients' satisfaction between service delivery systems were found to exist and were determined by delivery time, user opinion, access and quality of information.

Being consumer-responsive minimizes the potential of technology abandonment because of the attention paid to the complimentary match between person and AT device (Scherer, 2005b). To maximize benefits for users and reduce the incidences of abandonment of the AT, individuals with disabilities need increased support services and training (HHS, 2007; Lenker, 1998; Reimer-Reiss & Wacker, 2000; Scherer, 2005). Training has been identified as being important in the adoption and use of AT (Butterfield & Ramseur, 2004). Other factors with potential to impact selection and encourage use of AT (especially in the workplace) are the education of persons with disabilities as market consumers, and ease-of-use guidelines for selected AT (Stienstra et al., 2007). For example, device training should include straight-forward instructions for the aging population, in a requested form (written, spoken or electronic), with practice to provide them with the necessary knowledge and skills required for effective use and maintenance of AT (McCreadie et al., 2006; Pettersson et al., 2007).

Assessment and Training

The assessment process of matching user to technology is crucial, but it is often "fundamentally flawed" (Hoppestad, 2007). Important and distinct aspects of AT to

consider and research include: 1) the specific characteristics of the person (age, abilities, and preferences); 2) the learning environments where AT will be used; and 3) the goals that the AT is intended to support (Hopkins, 2004; Parette & Peterson-Karlan, 2007; Scherer, 2005b). A person who believes that he or she may benefit from using AT is expected to consult a health care professional, an occupational therapist, rehabilitation professional, hearing and vision health professional, or family physician (Copley & Ziviani, 2005; Health Canada, 2007; Pettersson et al., 2007). Consequently, these professionals are the gatekeepers in the lives of people with disabilities. Studies have identified the need to have AT training for these gatekeepers, as “their awareness of disability issues, knowledge of the benefits of AT, and ability to refer to appropriate specialists may be critical to whether people with disabilities obtain essential AT” (Jans & Scherer, 2006, p.70). Therefore, these people need to be educated on the availability, and potential, of AT and the type and methods of AT training will vary according to the role of the professional in supporting the AT user (Samuelsson & Wressle, 2008).

Peterson and Murray (2006) conducted a review of ethical issues that arise in AT service provision and suggested that in order to provide effective AT-related services, rehabilitation professionals need to take into account a variety of ethical considerations inherent in consumer-responsive service provision. Such ethical responsibilities include being aware of the AT available, and becoming comfortable with deploying AT. However, just as with consumers of AT services, providers of AT services likely demonstrate a wide range of emotions from being “techno-centered” to extraordinarily “techno-anxious” (Peterson & Murray, 2006). Rehabilitation professionals' reactions to

technology span a continuum from acceptance to anxiety. Pre-service and in-service training can help rehabilitation professionals become comfortable with AT, as well as remain contemporary (Scherer, 2005b). In Canada, however, it is claimed that the current training of medical personnel on disability is inadequate and too restricted by the medical model of disability (CCD, 2002).

Burton, Nieuwenhuijsen, and Epstein (2008) conducted a study to assess the experiences, opinions, and satisfaction levels of 24 individuals (13 women and 11 men) in Michigan, US related to AT usage. The respondents ranged in age from 19 to 71 years, had various disabilities (visual, musculoskeletal, nervous system, and other disabilities including learning disabilities), and all used computer-related AT. Data were collected via telephone interviews to investigate the experiences of users with disabilities and AT, the type of AT they use, their experiences with training, and the impact of the AT on the users' quality of life – and to also explore the applicability of the QUEST instrument. Training appeared to be an important component for the AT users in this study, many of whom preferred a setting to try out devices rather than group or individual training. Despite the fact that training has consistently been recognized as a critical need, the current system for accessing and funding training for AT products on “shoe-string” budgets remains insufficient (Peterson & Murray, 2006).

Services, Systems and Policies in Canada

In Canada, past initiatives to increase the spread of AT availability and use included a nationwide Web-4-All campaign, which was anticipated to be made available at local public Internet access sites across Canada (TBCS, 2004). The hope for Web-4-All was

that people who might not otherwise have access to computer technology could automatically configure public access computers and have their individual needs met, such as having text enlarged or read aloud (Industry Canada, 2007). Following some technological issues, and a “change of focus in Industry Canada, the funding partner,” Web-4-All is no longer being developed (B. Shire, personal communication, October 27, 2008). It is, however, being “heavily incorporated into other development and research work... at the Adaptive Technology Resource Centre at the University of Toronto” and is loosely supported in several communities who were part of the Web-4-All pilot project (B. Shire, personal communication, October 27, 2008). The ILRC, for instance, still has some involvement with this initiative (K. Marshall, personal communication, November 5, 2007).

Much of the research related to assessing the quality of, and satisfaction with, AT service delivery has been concentrated outside of Canada (Dijcks, Wessles, De Vlieger, & Post, 2006; Craddock & McCormack, 2002; O'Reilly, 2007). In Canada, the responsibility for providing disability programs and services varies between the provinces and is dispersed across many different departments (Disability-Related Policy in Canada, 2007). As a result, there are:

[G]aps in service provision, late referrals and inadequate follow-up, insufficient linkages with other departments and programs, and inadequate provision of information. The system becomes very confusing for people to navigate and they don't know where to go for the help they require. (Disability-Related Policy in Canada, 2007, A New Understanding section, para. 2)

There is minimal variation shown among the provinces in the reporting of people with disabilities having all their needs met for AT devices and AT services (Statistics Canada, 2007). If an individual is fortunate enough to obtain AT services, their ability to customize and use the technology effectively is hindered by lack of information of AT and fragmentation in service delivery, caused by a shortage of trained professionals (DeJonge & Rodger, 2006). It has been said that in order to encourage long-term, desirable organizational patterns of service delivery, the Government of Canada should implement national incentives to address the variance among provinces related to financial assistance for assistive devices, training of health care professionals, and the different policies, standards and procedures of professional organizations (CHHA, 2005). An overall improvement of the research, collection, analysis and dissemination of data related to poverty and disability is needed and should be a priority in achieving a strategy for socio-economic integration of persons with disabilities (ILO, 2002).

Programs and Services in Newfoundland and Labrador

Changes are being made in the disability services sector for Newfoundland and Labrador (NL). Recently, changes have been implemented to the provincial tax systems, allowing families of persons with disabilities to avail of the new Registered Disability Savings Plan (RDSP) which ensures that other levels of income support for persons with disabilities remain intact (Skinner, 2008). In the Speech from the Throne in 2008, the Government of Newfoundland and Labrador emphasized its commitment to achieving inclusion and working with the community of people with disabilities to develop recommendations and strategies to address barriers, including barriers to public services,

education and employment. Currently, the Department of Health and Community Services and the Department of Human Resources, Labour and Employment offer services related to AT, but no one department is specifically responsible for helping adults with disabilities obtain AT (Government of NL, n.d.). The Department of Health and Community Services offers a Home Support Services Program, Flat Rate Allowance, and Special Assistance Program. The Special Assistance Program (SAP) under the authority of the Department of Health and Community Services provides basic supportive health products (including AT) to individuals living in the community who have chronic health conditions and meet program criteria, to assist them with activities of daily living. (See Chapter 4 for more detail on this program).

Another important step toward improving disability services came in June 2009, when the Government of Newfoundland and Labrador launched a new Disability Policy Office to further its commitment to the inclusion of people with disabilities, lead the development and implementation of a provincial strategy and respond to community direction. It is “a new way of doing business, as government departments and agencies move away from working in silos to working with each other and the community to identify and remove barriers. The new office will assist by supporting the review and development of policies that guide government services in becoming more inclusive” (M. Reid, personal communication, April 14, 2009). The issue of inclusion is of great importance and will involve assessing the immense benefit of AT and its potential to remove barriers for people with disabilities. The Disability Policy Office is a division of the Department of Human Resources, Labour and Employment.

Summary

In summary, the literature emphasizes the benefits of AT, such as increasing access to educational and work opportunities, independent living and participation in all aspects of society. Ultimately, AT has the potential to improve quality of life. However, the literature reports high levels of abandonment of AT (Kintsch & DePaula, 2002), a lack of coordination between service providers (Craddock & McCormack, 2002) and lack of satisfaction among AT service users (Dijcks, Wessels, Vlieger & Post, 2006). Ultimately, AT is a tool that enhances the performance or functional capabilities of an individual with a disability in completing a task (Pettersen et al., 2007). However, it is still too common that people are without the technology they need to live independently and be active participants in society (Bartram & Jeffrey, 2004; Statistics Canada, 2008b). Typically, this is a result of a lack of knowledge on the part of the users, limited availability of trained personnel, and a shortage of resources (Hoppestad, 2007).

There is not currently a mechanism for ensuring that all policies take into account the needs and best interests of people with disabilities. The government plays an important role as regulator of information technologies, and also as the implementer of human rights legislation (Stienstra et al., 2007). In 2005, the Canadian Government proposed to introduce a National Disability Act, but at this time, no such Act had been passed. In the interim, the concept of Single Entry Point (SEP) systems present an encouraging alternative to the problems and gaps in current AT service delivery. The concept of SEPs will be explored in the next chapter, as this project aims to assess the possible implementation or appropriateness of an SEP for NL.

Chapter 4: Models of AT Service Delivery

The focus of this chapter is to present a critical overview of elements identified through in-depth literature review that may contribute to successful policies in the implementation of a single-entry point (SEP) system. One goal of this study was to assess the need for an SEP system in the province. To determine what approach would be best to implement an SEP system, I first review various frameworks that demonstrate the process that service providers (e.g. occupational therapists) use to recommend AT. Other authors who have conducted thorough reviews of the literature found that such concepts and frameworks for AT are scarce (Hersh & Johnson, 2008; Wielandt et al., 2006). This chapter also details comprehensive service provision in the US and throughout Canada. It is important to compare service systems in the US to what I am proposing for NL because the US government has generated state AT programs that have been largely successful (Wallace, 2003). These AT programs provide best practice guidelines for what can be accomplished in NL.

In the following sections, I review the various modeling frameworks related to AT, as well as several AT programs throughout North America, that may prove useful in serving as examples for how NL may establish an SEP system. Existing AT provision models contain components such as recycling programs, lending programs and demonstration centres for AT. In Canada, these programs vary by province with Alberta appearing to have the best well-developed programme of recycling AT (Vincent, 2000). Components of such systems have been delivered by organizations in NL that borrow or lend AT for either temporary or permanent use (e.g. ILRC, CNIB, CHAA-NL). It is difficult to

evaluate the quality of programs such as a recycling AT program as part of an SEP system as there are no established norms for this purpose (Vincent, 2000).

Comparing Models for AT Service Delivery

There are several models that disability service providers and occupational therapists use to recommend AT. The social model definition of disability described in a previous chapter forms the basis for these modeling frameworks (Hersh & Johnson, 2008). These models include the World Health Organizations (WHO's) International Classification of Functioning, Disability and Health (ICF) model, the Human Activities Assistive Technology (HAAT), the Matching Person with Technology (MPT) Model and the Comprehensive Assistive Technology (CAT) Model.

International Classification of Functioning, Disability and Health (ICF).

As mentioned in Chapter 2, the WHO moved toward a new international classification system in 2001- the International Classification of Functioning, Disability and Health (ICF 2001) and incorporated a new definition of disability. The new definition is more comprehensive, whereby disability denotes all of the following: (a) impairments in body functions and structures, (b) limitations in activity and (c) restriction in participation. The ICF acknowledges that the prevalence of disability corresponds to social and economic status and that an individual is more or less disabled based on the interaction between the person and the individual, institutional and social environments (WHO, 2001). The 2001 ICF supports universal design as an international priority for reducing the experience of disability and enhancing the experience and performance of all individuals.

As shown in Figure 5, the ICF Model has three health related domains with various components within each domain: The body (including body functions and body structures); the individual (including activity and participations); and societal perspectives (including environment factors). The ICF model serves as “a statistical and research tool for collecting health related data and quality of life data, as a clinical tool for assessing needs and evaluating outcomes” (Hersh & Johnson, 2008, p. 199). However, the usefulness of the ICF approach for social awareness and advocacy applications has been questioned because it excludes the perspectives of people with disabilities; It is also better suited to capturing and encoding quantitative rather than qualitative data (Hersh & Johnson, 2008).

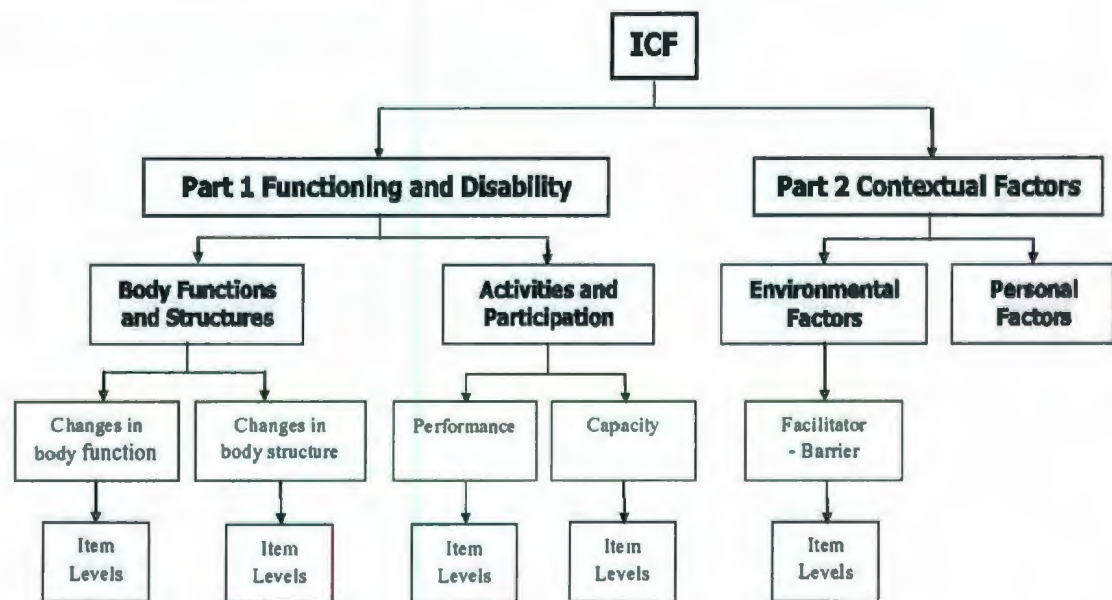


Figure 5: Overall structure of the ICF

Source: Reprinted with permission from Hersh and Johnson, (2008).

A major limitation of the ICF is that it does not suggest temporal or causal components to help predict outcomes in areas such as user satisfaction, quality of life, and cost (Lenker & Jutai, 2002).

Matching Person to Technology (MPT).

The MPT model was developed by Scherer and Craddock (2002) as a “selection” framework for AT devices with the expectation that it would “contribute to [AT] clinical practice and outcomes research by highlighting factors important to consider prior to selection and to designing research on the selection process” (Scherer & Craddock, 2002, p. 7). The MPT model (shown in Figure 6) complements the ICF model and provides a person-centered approach in assessing potential technology need, given the user’s needs and goals, the technology features, and environmental support (Craddock, 2006; Scherer, 2005a). The person component of the model (personal characteristics, preferences, social interactions and support) is better developed than in the ICF and HAAT models. The MPT model is considered a useful framework to guide the process of recommending AT (Wielandt et al., 2006). At the same time, the MPT model is limited because it is based on data obtained through the associated MPT assessment forms and therefore has an implicit, rather than an explicit classification process. Additionally, the MPT model lacks a process for considering technology details or factors such as ergonomic design, technical reliability and cosmetic appearance (Hersh & Johnson, 2008).

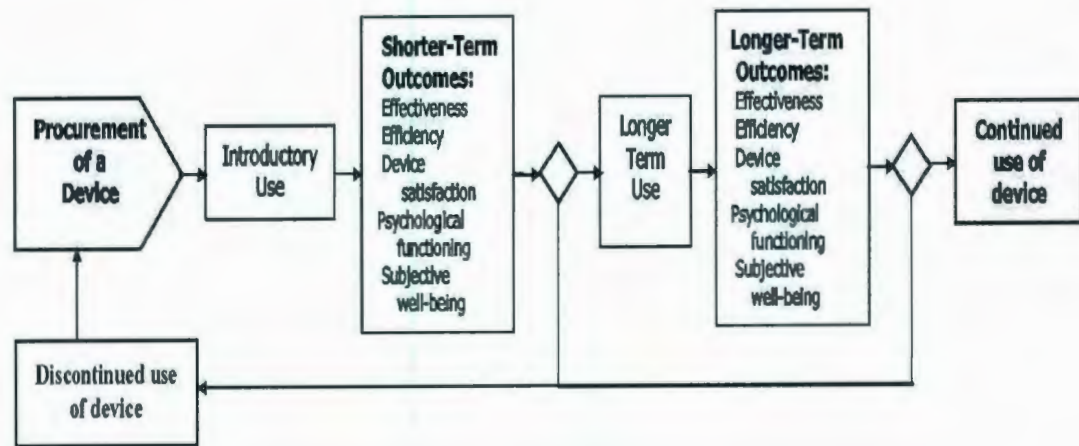


Figure 6: Conceptual framework for AT outcomes assessment, based on MPT

Source: Reprinted with permission from Hersh and Johnson, (2008).

Human Activities Assistive Technology (HAAT).

The HAAT model (Figure 7) was developed by Cook and Hussey in 2002 “to analyze the complexities of someone (a person with a disability) doing something (an activity) somewhere (within a context), especially when the use of AT is part of that context” (US Department of Education, 2005, p.1). So, the three components of the HAAT model are:

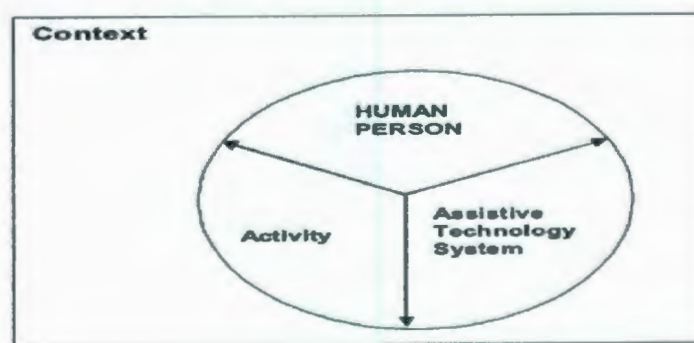


Figure 7: HAAT model of an AT system

Source: Reprinted with permission from Hersh and Johnson, (2008).

Human, Activity, and Assistive Technology. The flexibility and comprehensiveness of the HAAT model makes it useful in rehabilitation services (US Department of Education, 2005).

The HAAT model is a conceptual framework that contributes to the understanding of factors that impact on technology use once introduced into an individuals' environment (DeJonge & Rodger, 2006). It highlights the interplay between the AT user, the activities, the AT and the environment with each being pivotal to the success of an AT application. It proposes that the interrelationship between these factors is important throughout the whole process of acquiring and integrating the AT (DeJonge & Rodger, 2006). According to Hersh and Johnson (2008), the ICF, HAAT and the MPT models can be classified into three categories:

1. Classification methodologies
2. System modeling methods
3. Assistive technology outcomes modeling

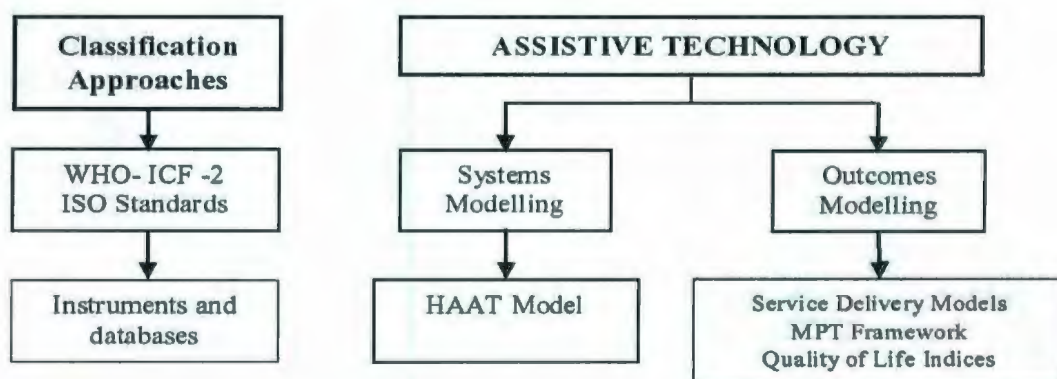


Figure 8: Approaches to modeling the AT domain

Source: Reprinted with permission from Hersh and Johnson, (2008).

As shown in Figure 8, the ICF falls under the classification approach, while the HAAT model is located under systems modeling and the MPT framework comes under outcomes modeling. However, none of those models cover the full range of applications (Hersh & Johnson, 2008). They assert that removing barriers to enable opportunities for full participation of people with disabilities “will require the development of new [AT] systems and improved information and distribution systems for existing assistive technologies” (Hersh & Johnson, 2008, p. 193). Therefore, in an effort to address the need for effective and ongoing dialogue between the end-user community, and the service community who are involved in the development, provision, assessment, and ongoing support for AT, a new modeling framework was proposed.

Comprehensive Assistive Technology (CAT).

Hersh and Johnson (2008) proposed the Comprehensive Assistive Technology (CAT) that aimed to incorporate common terminology, concepts, and definitions (Figure 9).

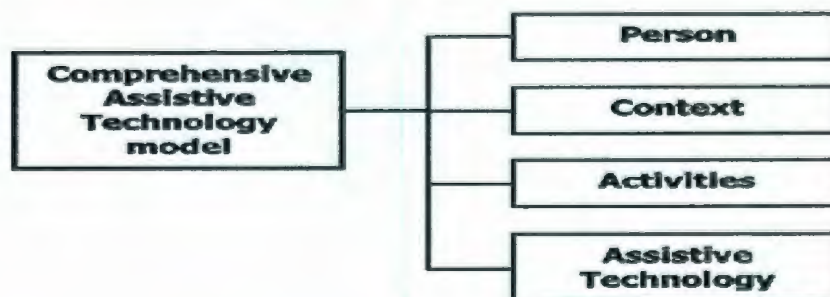


Figure 9: Comprehensive Assistive Technology (CAT) model

Source: Reprinted with permission from Hersh and Johnson, (2008).

This new framework is said to be applicable for:

1. Identifying gaps in assistive technology provision.
2. Analyzing existing assistive technology systems.

3. Developing specifications for new assistive technology systems.
4. Supporting the provision of assistive technology for particular end-users.

The CAT Model features a comprehensive description of an AT system in terms of the characteristics of the person using it, the activities they are carrying out, the technical, end-user and other specifications of the technology and the context in which the technology is being used (Hersh & Johnson, 2008). Its use requires further research, particularly in the use of the CAT model as an investigative and data gathering tool, the possible creation of a suitable AT database and an interactive software implementation for use by individuals, and social, caring and rehabilitation professionals. To date, there is no literature that references the CAT model.

I created Table 5 to provide a comparison table to illustrate the four models and display the applications, strengths and limitations of each.

Table 5

Comparison chart of the four models of AT service delivery

Model	Applicability	Strengths	Limitations
ICF	<ul style="list-style-type: none"> • Statistical tool, research tool, clinical tool and educational tool 	<ul style="list-style-type: none"> • Focuses on the impact of disability • Places all health conditions on equal level for comparison • Considers social aspects of disability and records impact of environment on functioning 	<ul style="list-style-type: none"> • Influenced by the medical model • Does not have an explicit way of including the perspectives of people with disabilities • Lacks temporal and causal components for predicting outcomes
HAAT	<ul style="list-style-type: none"> • Enables discussion of the general content of the model's components • Provides technical labels for AT technology components • Provides an educational framework for AT studies 	<ul style="list-style-type: none"> • One of the very few attempts to present a general systems structure for the technology of the assistive system. • Contributes to understanding factors on technology use 	<ul style="list-style-type: none"> • Better suited to modernized regions or countries • An engineering rather than end-user focus • Does not specify performance areas • Lacks research and development • Few examples of its use in assessment procedures • Influenced by medical model
MPT	<ul style="list-style-type: none"> • Determines outcomes and appropriate AT for a person in a given environment, rather than having a detailed classification structure 	<ul style="list-style-type: none"> • Identifies goals and technologies that could be used to improve functioning • Identifies characteristics of the person, environment or technology that affect individuals' use • Person component is better developed 	<ul style="list-style-type: none"> • Influenced by the medical model • Better suited to modernized regions or countries • Has no formal structure • Has an implicit classification, rather than an explicit classification process • No consideration of technology details and factors
CAT	<ul style="list-style-type: none"> • Identifies gaps in AT provision • Analyzes existing AT systems and creates requirements for new ones • Supports provision of AT for end-users 	<ul style="list-style-type: none"> • Greater flexibility and much wider range of applications than HAAT, • Lower level structure. • Person-centred 	<ul style="list-style-type: none"> • Its use requires further research, particularly as an investigative and data gathering tool.

Single-Entry Point (SEP) Systems

The concept of an SEP system was first explored in the area of home care with the goal of streamlining service delivery. Pan (1995) viewed SEP systems as a "one-stop shop" process providing people with access to long-term care services and described the SEP system as a funneling process through which potential clients can be screened, assessed, advised, and directed to appropriate services, whatever those services are. Vanderheiden (1997) proposed a model for a cooperative information system, seeking to get the most benefit from emerging telecommunications and information technologies. His unique plan for a "cooperative, distributed, single-entry information system," proposed that an SEP system could be used for any type of disability-related information and a means to quickly route peoples' inquiries to locations or individuals with the appropriate level of expertise to provide accurate and timely information. Vanderheiden's model is the most comprehensive that I have found in terms of discussing a detailed information system for disability-related information. The system he proposed could be accessed via mail, telephone, or directly over the internet.

The most important feature of an SEP system is a "No Wrong Door" mandate, whereby individuals may enter a range of community agencies and service sites meaning that consumers do not necessarily have to enter through a single geographic site or location (Armour-Garb, 2004). Alternatives include home visits, toll-free telephone numbers, a single local or a regional agency with multiple locations.

Underlying the concept of a one-stop shopping process is the idea that services for people with disabilities "can be made more accessible, and service delivery can be more

efficient, by coordinating services at central locations” (Timmons, Boeltzig, Fesko, Cohen, & Hamner, 2007, p. 85). Although a single, standardized entry process is administered and overseen by a coordinating unit (Armour-Garb, 2004) each agency retains responsibility for their respective services while coordinating with each other to ensure that an individual’s need or request is identified and addressed, whether through treatment or referral, regardless of where he or she enters the realm of services.

When applied to AT service delivery, an SEP system has the potential to provide people with diverse disabilities access to a range of disability-related supports and services through one location. According to the Governor’s Council on Disability (2006), an SEP is efficient, effective and user-friendly as it facilitates peoples’ ability to learn about eligibility for services, receive assistance to get access to those services and coordinate the delivery of those services. An SEP would also provide information, referral and a province-wide database of information related to AT.

SEP systems also have potential to address a number of service delivery issues: quality assurance of facilities, programs, and personnel at the federal, provincial, and local levels; equity issues (including the disparity between rural and urban access to care); disparity of funding sources; training, and assisted employment for people with disabilities (Pan, 1995). Despite the benefits of an SEP system, there have been some concerns expressed about how an SEP might impact current systems of service delivery for people with disabilities. For example, the Governor’s (2006) report conducted research using focus groups and surveys, and revealed three major concerns for an SEP:

marketing, training and how service delivery was communicated. The next section provides examples of SEP systems in North America and what they involve.

One-Stop/SEP Service Systems in the US

Assistive Technology Partners – Breaking barriers, changing lives.

Assistive Technology Partners was established in 1989 under a federal grant from the US Department of Education, National Institute on Disability Rehabilitation Research.

Today, Assistive Technology Partners is part of the Department of Physical Medicine and Rehabilitation, School of Medicine, University of Colorado, Denver. It has programs in four major areas: clinical services, outreach and information services, research and engineering, and education.

This statewide program provides single entry access for individuals with disabilities trying to determine where to seek funding for AT devices, equipment or programs. The website allows an individual to search by location in Colorado, diagnosis, age, area of need, type of device, equipment or program (University of Colorado, Denver, 2009). Their clients are consumers, family members, caregivers, education professionals, rehabilitation counselors, or health professionals. By establishing a dynamic and interactive relationship with their constituency, comprehensive services are coordinated across all organizational environments in the following areas: AT awareness training, training on the use of technology, and ongoing technical assistance (University of Colorado Denver, 2009).

National Information System for AT.

The National Information System for AT (NISAT) is a cooperative agreement between the US Department of Education and the Association of AT Act Programs. The mission of the Association is to collaborate with persons with disabilities and others at the national level to increase the availability and utilization of AT devices and services for all individuals with disabilities in the US. Thus, the aim of the NISAT is to provide timely and accurate collection, analysis, and reporting of data relating to the activities of the 56 State AT Programs, funded under the AT Act of 1998, as amended and located throughout the US. The NISAT website is fully accessible, containing information on grants for AT programs, short-term device loans by type of purpose, device recycling/refurbishment/repair activities, etc. Many of the state AT programs serve as a one-stop or SEP system for AT by providing services such as:

- AT try-out centers around the state
- Hands-on demonstration of AT for computer access, activities of daily living, listening, communication, telecommunication, mobility, education, learning, leisure, play, alarm/emergency systems, and environmental controls
- AT resource information and referral to other programs
- Awareness activities about AT and its uses
- Advocacy for individuals and their families on their rights to AT services
- Funding resource information based on the person's needs
- Technical assistance in selecting the appropriate AT devices
- Short term loan of AT equipment to try out at work, home, school, etc.

- Training on specific devices / software
- Specialized workshops / seminars, group training, and technical presentations

Two examples of these AT state programs are The Wisconsin AT Program and the Massachusetts Assistive Technology in Consumer's Hands. Both serve as best practices of what an SEP system should look like.

The Wisconsin AT Program provides information on selecting, funding, installing and using AT. It is administered by a unit of the Department of Health and Family Services, Division of Disability and Elder Services. The program is funded to provide four State Level activities: 1) device loan, 2) device demonstration, 3) device reutilization and 4) alternative financing.

The Massachusetts AT in Consumer's Hands is administered through the Massachusetts Rehabilitation Commission Community Services. The AT Program offered through the Commission aims to improve the ability of individuals with significant disabilities to live independently through the use of AT.

A website serves as the entry point for accessing services by providing improved navigation and accessibility in addition to a wealth of new programs, resources, and features (Commonwealth of Massachusetts, 2009). The website is supported by the Massachusetts Independent Living Centre, who describes it as “a comprehensive place to go for state and national AT resources and programs,” (Commonwealth of Massachusetts, 2009). In addition to providing information on how to find, try, borrow, fund, and buy AT devices, the website’s new programs and features include:

- An AT Services Directory to help users find providers of AT services and training close to home.
- Ask the Expert, AT Forum, and AT Product Review pages on the Get Help menu.
- The AT School Swap to help schools maximize their resources and quickly students the devices they need.
- For Educators, For Employers, For Providers home pages to help these targeted audiences find what they need and get answers to their questions.
- Online access to the inventory of the AT Device Loan Programs.

Annual reports from the MRC using survey responses from consumers have demonstrated the success of their AT Program. In 2006, the Massachusetts Rehabilitation Commission administered a "Survey of Assistive Technology Users in Massachusetts." Of the total responses, 239 (61%) were AT users themselves. Overall responses indicated that when choosing what an individual thought was most important from 3 choices (demo centers, device loan programs and reutilization programs), 44% chose AT demo centers as most important, 41% chose AT device loan program as most important and 20% chose an AT reutilization program as the most important. Allocation of program resources was based on these responses (Massachusetts Rehabilitation Commission, 2006).

Demonstration centres are highly beneficial to consumers, because they are able to try out AT equipment, with trained staff. This means that before they invest large sums of money into it, they are able to ascertain if there is a good fit between themselves and the AT.

Availability and Access to AT in Canada**Ontario.**

The Ontario Ministry of Health and Long-Term Care runs an Assistive Devices Program (ADP) to help people who have long-term physical disabilities get needed equipment and supplies (Government of Ontario, 2006). In some cases ADP pays 75% of the cost of items like orthopedic braces, wheelchairs, and breathing aids. In the case of artificial limbs and breast prostheses, for example, ADP contributes a fixed amount up to a maximum contribution. For some supplies (e.g. needles and syringes for insulin-dependent seniors), ADP pays an annual grant directly to the person.

Individuals receiving social assistance benefits under Ontario Works, Ontario Disability Support Program, or Assistance to Children with Severe Disabilities, may be eligible to receive more money. There are no income limits for ADP assistance. Any Ontario resident who has a long-term physical disability and a valid health card issued in his or her name is eligible to apply for this help. Fact sheets on each category of equipment specify medical conditions people must meet to get help in paying for equipment. The fact sheet, which is available on the website, for each equipment category lists the devices and supplies eligible for ADP funding. This program covers over 8,000 separate pieces of equipment or supplies. I created Table 6 to feature some categories of equipment covered under the ADP:

Application for ADP assistance begins with an application or authorization form. The applicant (or an authorized third party) will fill out part of the form. The rest is filled in by one or more authorized individuals, often a medical or other health care professional,

who may perform a medical assessment. For some types of equipment, such as artificial limbs and certain communication devices a team of skilled specialists have to conduct a needs assessment. Devices must come from suppliers who are registered vendors with ADP. If the device such as a limb prosthetic must be custom-made, referrals are made to trained professionals also registered with ADP. If a physician or other authorized individual determines that a piece of equipment is no longer suitable because of a change in an individual's condition or size, ADP will contribute to the cost of replacing it.

Table 6:

Category of AT and what disability it can be matched with.

Category of AT	Matching Disability
Communication Devices (e.g. voice amplifiers, hearing aids)	Language or speech impairment
Hearing Aids	Deafness
Orthotic Devices	Mobility
Prosthetic Devices (Breast, Limb, Ocular, Maxillofacial)	A replacement for a part of the body
Respiratory Supplies and Equipment (e.g. ventilators, apnea cardiorespiratory monitors)	A long-term respiratory condition
Visual Aids (e.g. magnifiers, telescopes and specialized glasses)	Long-term low vision or blindness
Mobility Devices (e.g. wheeled walkers, wheelchairs, standing frames, and specialized positioning supports for wheelchairs, such as seat cushions)	Long-term physical disability requiring the use of a mobility device

If the equipment is worn out, beyond repair at a reasonable cost, ADP will pay up to 75% of the cost of replacement at the end of a certain time period. ADP will not pay for replacement of equipment that is lost, stolen or damaged due to misuse before the minimum replacement period is up. Clients are encouraged to buy insurance to cover the cost of replacement in these cases. A representative from one of Canada's AT vendors stated that Ontario's ADP program "is as advanced as it gets in North America" (G. Melendy, personal communication, February 23, 2009). However, not all persons with disabilities are well served by this Ontario program. A person with a learning disability, for example, can get ADP help *only* if they also have a physical disability that requires the use of the device for which they are applying.

British Columbia.

The AT program in British Columbia entitled AT-BC is similar to Ontario's ADP in that it enables people to access AT but it offers additional training on how to use the AT. AT-BC was implemented in 1993, and proposed to optimize the benefits of both centralized and distributed information models. It serves: "[t]o provide assistive technology resources to persons with disabilities and members of the environments in which they study or work in order to create equitable and useable environments" (AT-BC, 2006). AT-BC operates a bundle of technology service programs that are funded through the provincial Ministry of Advanced Education and Ministry of Housing and Social Development. The program was established with the mandate to provide AT resources for adults with disabilities in training and employment settings.

Through AT-BC, participants referred through the Employment Program for Persons with Disabilities (EPPD) are eligible for AT resources to reduce barriers caused by their disability in order to prepare for, obtain and maintain employment. Technology resources include: technical aids assessment, loan of AT, training on the use of the AT, troubleshooting, and repair services, all of which facilitate independence with reading, writing, and communication within training and employment environments.

Referrals for service are received from three sources: EPPD Service Provider (contracted agency), EPPD Disability Consultant, and post-secondary Disability Service Coordinator or Advisor. AT-BC staff are trained AT consultants, who each have their own areas of expertise (e.g. Learning Disabilities Consultant, Vision Technology Consultant, etc). They develop a Technology Assessment and Plan (TAP) when the participant is approved for EPPD technology support that considers the following factors:

- Impact of disability regarding limitations and abilities with hearing, seeing, communicating, writing, typing, body position, mobility, and lifting;
- Future prognosis of the disability;
- Work or training tasks that need to be done;
- Equipment and support services available on site and requirements of the computer network;
- Participant's current skills with technology;
- Software application programs that will be used on the computer;
- Ergonomics of the office or work space;
- Office procedures that affect the use of assistive technology; and

- Strategies for integrating assistive technology into the workplace.

If an individual with a disability requires AT to get or retain employment, equipment is provided on a loan basis for the duration of the employment plan. When the participant terminates the plan or has been supported in a job for one year, he/she has the option of returning the equipment to the loan bank or purchasing it for a reduced price. The purpose is to ensure that persons with disabilities are able to prepare for, obtain, and maintain employment through the use of the appropriate AT. They also provide services on a fee-for-service basis for individuals or organizations that do not otherwise qualify for any of the other provincially funded programs.

Newfoundland and Labrador.

A review of the disability-related community organizations in NL show that there are some services to assist consumers in the area of AT (see Appendix A). Several nonprofit organizations have been instrumental in promoting awareness of AT and providing access to appropriate AT services to the population of people with disabilities. These organizations include the ILRC, LDANL, and the CNIB. Throughout 2006-2007, the ILRC's AT Program participated in an external formative evaluation of their Adaptive Technology Program. This evaluation consisted of four components: a literature and administrative document review, key informant interviews, focus groups, and participant telephone surveys (Gallant, 2006). Noted strengths of the program include, but are not limited to, their cross disability focus, demonstrated staff expertise in adapted technology and equipment, capacity to demonstrate AT equipment, and capacity to provide

information and training to both individuals and groups. A limitation to their AT program is the lack of trained AT experts within the organization.

LDANL conducted an AT Awareness Campaign entitled “Assist me –Please!” (AMP) in 2008, and delivered information sessions throughout the province. Based on assessed need, an AT lab was established at the LDANL office in St. John’s and clients were provided with one-to-one orientation sessions on AT. The lab is inactive because there is no longer an AT expert in place.

Recently, the CNIB opened a new AT Centre in St. John’s. It provides an advisory service and training program to meet the needs of people with vision loss in NL. AT specialists are available for advice on the best equipment to meet individual circumstances and to also install AT and provide basic training as well as technical support for people with vision loss. Training may also be provided in a workplace, educational setting or at home. This service is also available to employers and other agencies to assist in the placement and retention of people experiencing vision loss in the workforce. AT specialists also travel to rural areas of the province (CNIB, personal communication, May 5, 2009). However, staff is self-taught on the AT and lack the knowledge to provide cross-disability service.

There are various departments within the Provincial Government that also provide some support for individuals seeking AT (see Appendix B for a list of Provincial and Federal programs). However, because there is no system that coordinates this provision of AT services, and no contact person within government to answer questions in this field, this information is not easy to find or understand and it may be very frustrating to

individuals seeking financial and other information for AT. Effective and ongoing communication is essential between the end-user community and the various services and disciplines involved with the provision, assessment and ongoing support for people with disabilities (Government of NL, 2006). This is especially pertinent in the area of AT (Hesh & Johnson, 2008). Having a system in place, devoted to AT that is easy to navigate, may result in better, less expensive, and timelier solutions.

The Department of Human Resources, Labour and Employment in the provincial government provide support for people with disabilities to obtain AT under a number of divisions and programs:

1. Labour Market Agreement for Persons with Disabilities (LMAPD)
 - a) for people with disabilities and demonstrated challenges in accessing education or employment;
 - b) includes *Employability Assistance for Persons with Disabilities* which is cost-shared with Human Resources and Skills Development Canada.
2. Poverty Reduction Strategy Initiatives for persons with disabilities:
 - a) *Supports to Employment for Persons with Disabilities* - responds to the disability related support needs of adults with disabilities who wish to participate in or maintain employment. It includes work place accommodations, work place adaptation, assistive devices (e.g. hearing aids, visual scanners, readers, technical equipment), AT such as computer aides or software which can be used by persons with disabilities to aid in finding and maintaining employment.

- b) *Internships to Promote Technology for Persons with Disabilities* - an Internship Program in computer technology for 10 persons with disabilities. Interns acquire skills in the area of AT and how technology can be used to respond to the related support needs of adults with disabilities who wish to prepare for, participate in or maintain employment. The interns support individuals with disabilities in a number of locations throughout the province and Labrador through the use of technology and virtual offices.
- c) *School to work transition supports for Persons with Developmental Disabilities* - enables the provision of necessary supports to assist students with developmental disabilities in accessing summer/after school work opportunities to ease the transition from secondary school to work or post secondary training.

As briefly mentioned in Chapter 3, the Special Assistance Program (SAP) under the authority of the Provincial Government's Department of Health and Community Services provides access to basic supportive health products to individuals living in the community who have chronic health conditions and meet program criteria, to assist them with activities of daily living. This program also provides orthotics to eligible individuals who are residing in Long Term Care Homes. The Special Assistance Program is managed by the Regional Health Authorities (RHAs). An approved listing of available supplies, equipment and orthotics is maintained by the Province. Examples of items covered under the Special Assistance Program include:

1. Health/medical supplies (e.g. incontinent supplies, catheter supplies, gloves, ostomy supplies, humidifiers)

2. Oxygen supplies (e.g. oxygen, oxygen equipment and accessories)
3. Medical equipment (e.g. wheelchairs, walkers and commodes)
4. Orthotics (e.g. braces, artificial eyes)

AT for people with learning disabilities, for example, are noticeably absent from this list.

To be eligible for Special Assistance Program, an individual must meet financial assessment criteria (inclusive of liquid asset levels) and have:

1. a documented chronic condition or a condition requiring equipment for a short term need;
2. a demonstrated long term (greater than three months) or palliative need for the product;
3. a professional assessment and where necessary a prescription completed;
4. a valid MCP card.

Summary

To be active and contributing members of society people with disabilities must have reasonable access to the supports and resources they need. In the case of AT service delivery, “[n]o preferred method has emerged as the method of choice . . . [and] each method needs to consider the unique social, financial and political environments in which it exists” (Ripat & Booth, 2005). An SEP system can help achieve inclusion of people with disabilities and ultimately contribute to a person’s overall health, by providing one-stop access to information and resources on AT. Whether they are at the beginning stages of figuring out the world of AT and how they can obtain or use it, or whether they are already using AT and want to maximize the benefit of it, an SEP is a valuable system of reducing the fragmentation of information that may prevent people from using AT.

Chapter 5: Research Methodology and Method

This chapter presents the methodological and theoretical underpinnings of my study and the methods I employed in conducting my research. First, I discuss my epistemological stance and the conceptual framework that underpins my approach to this mixed methods research. Next, I discuss the process of producing trustworthy data for both quantitative and qualitative data, using the criteria of credibility, dependability, confirmability, and transferability and I describe the rationale for a mixed method research design. Then, I split the chapter into procedural details for each of the quantitative and qualitative methods. For the quantitative portion, I detailed the development and distribution of the survey instrument, survey participants, recruitment and sample, and quantitative data analysis. For the qualitative portion, I discussed the construction of the interview questionnaire, recruitment of interviewees, interview procedures and qualitative data analysis. Finally, I describe the challenges I faced and the lessons I learned by conducting research the way that I did.

Conceptual Framework and Epistemological Stance

Methodology develops from the researcher's ontological and epistemological stance.

Ontology, as Mason (2002) describes it, is the theory of being (understanding what kinds of things there are in the universe to be known about) – and not about self-created things; Epistemology is how we come to know these things (i.e. the theory of knowledge).

Through this study, I seek to know the experiences of several groups of stakeholders in the area of disability services. Initially, I thought I could know their experiences through the use of survey data alone, but I quickly realized that to be truly cognizant of crucial

matters of ontology and epistemology, I needed to employ various strategies to understand the experiences of consumers with disabilities in the province of Newfoundland and Labrador. Methodology, on the other hand, is focused on the specific ways (methods) that we use to gain a better understanding of our world. It consists of the groundwork that guides the research question and the rules that govern the methods and data analysis that will be used (Giddings & Grant, 2007). However, understanding the difference between the terms *methodology* and *methods* and the terms *qualitative* and *quantitative* is often problematic (Wilkins & Woodgate, 2008). Giddings & Grant and Sandelowski (as cited in Wilkins & Woodgate, 2008) found that the distinction between the latter two terms seems to be one of epistemology, as traditionally:

quantitative research has been synonymous with a positivist/scientific worldview (i.e., reality as singular and objective) and qualitative research with an interpretivist/constructionist worldview (i.e., reality as multiple and individually constructed); so they differ with respect to the kinds of information they produce (p. 25).

The difference between a positivist and an interpretive paradigm is that a positivist paradigm recognizes reality as being objective and not dependent on the researcher, whereas an interpretive paradigm views reality as subjective and socially constructed (Mason, 2002).

My undergraduate training influenced me to think that the best way to obtain data was through quantitative, structured methods that would lead to concrete evidence to be studied and analyzed in a statistical process. I became used to looking at statistical

outputs to learn how things were. I tried to stop myself from asking “why” things were this way because, in my view, that was a question for further research to indulge in. Through my graduate work, I have tuned into the many benefits and advantages of qualitative research and have gained an appreciation of the in-depth information that it provides. Using the term “data generation” instead of “data collection” intrigues me - how we approach what it is we seek to know about, can directly affect *how* we learn about it. I now understand the level of complexity and rigorous work that qualitative research entails.

The study participants come from a variety of backgrounds, including individuals with various disabilities, service providers/organizations, and educational institutions. The information sought from each source required a slightly different approach and use of terminology. Prior to beginning this study, the only training I had in disability services came from a two month internship I had at the College of the North Atlantic through the Independent Living Resource Centre. I subsequently did a great deal of research, through academia, online information, peer support and my own observations and experiences. I also became educated on the Disability Rights Movement. Having one’s research done beforehand is not typical of qualitative research, but it can be looked at from the point of view that it is a good beginning point (Polit & Beck, 2004).

One question that persisted in my reflexive journal throughout the proposal process was, “with little interview experience, and relatively none with a vulnerable population, how can I maximize data generation in this study?” In my employment experiences with both the ILRC and LDANL, I was in contact with service providers and consumers and I

learned how important AT was for people and how difficult it can be for people to access it. This knowledge helped me to identify the relevant issues, and to understand the context in which my research would take place. During the data generation phase, I was able to identify with the interviewees through my knowledge of disability and where gaps are in understanding and responding to the unique needs of people with disabilities. In the beginning of my research I asked my qualitative research course instructor how I could avoid asking biasing, wordy, assuming and irrelevant questions in an interview, and she advised me to adhere to ethical guidelines and that most qualitative researchers learn as they go, as “adequate training is an illusive concept” (D. McLellan, personal communication, March 11, 2008)

As a monitoring process, I kept a reflexive journal, as recommended by Polit and Beck (2004), to record my “personal experiences, reflections, and progress in the field” (p. 730). This journal enabled me to note things such as methodological challenges (e.g. gaining access); my personal values, biases, and assumptions; areas of possible role conflict; gatekeepers’ interest and the degree to which they were favorably or unfavorably disposed toward my research; any feelings I had about my biases and how they may impact on my data generation and interpretation and new and surprising findings in collecting and analyzing data.

Giddings and Grant (2007) clarify methodology and method in this way: *methodology* is the “thinking tool,” belonging within certain paradigms and *methods* are the “doing tools” for collecting and analyzing data. Methodologies are not mixed in mixed method

(or multi-method) research, but are reflected in what methods are combined and how and why they are combined (Sandelowski, 2000).

The intent of my study is to assess the experiences, opinions and satisfaction levels of adult consumers and disability service providers in various locations in the province. I decided that my questions would be best addressed by the combined use of surveys with end users and individual interviews with service providers, which would enable a richer, more detailed picture of the experiences of both groups in getting and delivering access to AT services. The study also aims to assess the possibility of a province-wide single-entry system for providing AT to people with disabilities residing in NL. Therefore, a mixed method approach was taken.

Mixed Method Research

Mixed method research combines the collection and analysis of quantitative and qualitative data (Polit & Beck, 2004). A mixed method is advocated as the most appropriate means of evaluating and understanding individuals' perspectives than a quantitative approach alone (Brazier, Cooke & Moravan, 2006). Quantitative and qualitative refers to different "types of methods," and because methods are 'a-theoretical' and "a-methodological", they can be mixed without contradiction (Giddings & Grant, 2007, p. 4).

Mixed method research may be complex. This quote by Creswell et al. (2004) captures this complexity very well:

Unquestionably, mixed methods research is labor-intensive in that it involves multiple stages of data collection and analysis . . . [and usually has] multiple

authors, external funding support, and study teams with expertise in quantitative and qualitative approaches as well as knowledge about current mixed methods models being discussed in the social and behavioral sciences. (p.11)

The mixed method approach is particularly relevant to my study because it involves reviewing the opinions of consumers (end users) and service providers in the disability community to assess the feasibility of an SEP system for AT for people with disabilities in NL. Despite the complexity of engaging in mixed method research, doing so has many advantages and more and more masters students are doing mixed methods because it gives them a chance to develop skills with more than one "tool." Creswell, Fetters, and Ivankova (2004) as well as Polit and Beck (2004) report several advantages of mixed method research: The first is its complementary strengths and weaknesses, "using multiple methods, researchers can allow each method to do what it does best, with the possibility of avoiding the limitations of a single approach" (Polit & Beck, 2004, p. 274).

Two more advantages are the potential for rigorous, methodologically sound studies in health services and the ability to address a wider range of questions than quantitative alone. Other advantages include the development of comprehensive knowledge, the provision of feedback loops that supplement the incremental gains in knowledge from a single-method study, and ensuring that disempowered groups in society are heard. Of particular importance to my study is the point about ensuring that disempowered groups in society are heard. People with disabilities have traditionally been left out of research directly affecting them. This has left many feeling disempowered over the years. My research aimed to empower participants, especially survey respondents (consumers), by

giving them an opportunity to participate and a medium to express their concerns, thoughts, opinions and experiences about the provision of disability services in NL. The final advantage of a mixed methods approach is that it enables a systematic investigation of a phenomenon.

Using a framework developed by Guba and Lincoln (1989), the choice of experts for my study was guided by two of the specified stakeholder categories described by Guba and Lincoln and who are said to enrich the discussions: 1) those who introduce, produce, or use a project (i.e. service providers) and 2) those who could benefit from the project (i.e. people with disabilities/consumers) (Vincent, 2000). The providers know about issues that confront them a regular basis and the process of delivering care services, while:

[p]eople with disabilities and their families will have their own experiences to add, which will pinpoint the essential questions for improving the health of lots of people with disabilities. Each of these groups will have data to offer and ideas about how to collect more and how to get access to those who have information that will be useful. Each of them may have different, but overlapping, uses for the end results. (Kirby et al., 2006, p.48-49)

Decisions for Mixed Method Research Design

There are four research design decisions that need to be made in a mixed method research design (Creswell, Fetters, & Ivankova, 2004). The first is the priority given to the quantitative and qualitative methods in framing the research question. I devoted a substantial amount of time framing my research question, consulting both quantitative

and qualitative literature sources. This point brings me to the second design decision, which involves determining the type of design that will be used.

The two primary mixed methods research designs are concurrent and sequential (Creswell et al., 2004; Giddings & Grant, 2007). The concurrent design of mixed methods intends to gather both quantitative and qualitative data at the same time, whereas the sequential design involves collecting data in sequence, with one method following the other (Polit & Beck, 2004; Creswell et al., 2004). The concurrent model typically gives equal priority to quantitative and qualitative data and analysis (often found in separate sections of the final report), involves concurrent or simultaneous collection of data, often from the same sources, and integrates both quantitative and qualitative data in the results, interpretation, and conclusion phase (Creswell et al., 2004). In essence, the purposes of this design “is to confirm, cross-validate, or corroborate findings from one method with those from another” and thereby develop a richer and more credible understanding of the research problem (Wilkins & Woodgate, 2008, p.25). I collected quantitative data at the same time as I was in the field gathering qualitative data from key informant interviews. This concurrent approach was more practical given the time restrictions of doing a masters thesis (Creswell et al., 2004).

The third design decision is whether to use an explicit theoretical framework to guide the entire study. It is important that “the theoretical framework and methods match what the researcher wants to know, and that they acknowledge these decisions, and recognize them as decisions” (Braun & Clarke, 2006, p. 80). To avoid strict adherence to a theoretical framework, such as grounded theory, thematic analysis can be undertaken,

which “means researchers need not subscribe to the implicit theoretical commitments of grounded theory if they do not wish to produce a fully worked-up grounded-theory analysis” (Braun & Clarke, 2006, p. 81). I did not strictly adhere to grounded-theory analysis for this study, but I used the procedure of constant comparison in my data analysis. Constant comparison means “[c]ategories elicited from the data are constantly compared with data obtained earlier in the data collection process, so that commonalities and variations can be determined” (Polit & Beck, 2004, p.255).

The fourth decision described by Wilkins and Woodgate (2008) concerns when to integrate (mix) quantitative and qualitative methods. It can occur at any time during a study, and for my research, I chose to integrate during the discussion section.

Producing Trustworthy Quantitative Data

There are many qualities used to establish the trustworthiness of quantitative data including validity, reliability, and generalizability. There are three major types of validity for quantitative studies: construct, external and internal (McKay, 2006; Polit & Beck, 2004). Construct validity is the degree to which an instrument measures the construct that is under evaluation (Polit & Beck, 2004). Therefore, if a researcher wants to determine the extent to which one variable influences another, then the researcher must find a way to operationally define the influencing variable. For this study, the objective was to determine the extent to which satisfaction with AT influences use of the AT, therefore a well-validated questionnaire for the satisfaction of AT users with the device and with the service delivery process was used. This instrument is called the Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST) 2.0 and has been proven “to be a

highly applicable, reliable and valid instrument to assess user-satisfaction of users of all kinds of assistive device provisions” (Wessels & DeWitte, 2003, p. 267). The QUEST is described in greater detail later in this chapter.

External validity refers to the generalizability of the research findings to other settings or samples (Polit & Beck, 2004; McKay, 2006). In quantitative studies, generalizability is often achieved if the sample has been randomly selected from a representative group from the target population (Polit & Beck, 2004). In my study there was no random selection.

Internal validity refers to “the degree to which it can be inferred that the design has controlled for variables that could influence the outcome of the study” (McKay, 2006, p. 12). For my study, administering the surveys at one point in time eliminated the effects of maturation (changes resulting from the passage of time), testing (effects of a pretest on outcomes), instrumentation (changes in the way data is collected over time) and mortality (effects attributable to subject attrition, which is the loss of participants over the course of a study) (Polit & Beck, 2004).

Reliability is a second criterion for assessing the quality and adequacy of a quantitative instrument and the trustworthiness of the data that will be produced (Polit & Beck, 2004). There are two types of reliability: internal and external. Internal reliability is the extent to which someone else analyzing the same data would come up with the same results (Polit & Beck, 2004). This can be judged using intercoder reliability, whereby two or more researchers analyze the same data, using the same categorization system to see if they come to similar conclusions (McKay, 2006). Intercoder reliability checks were

completed with a member of my supervisory committee properly trained in coding and statistical analysis. Adding more items to the instrument that tap the same concept is another way to improve internal reliability (Polit & Beck, 2004). For example, two multiple answer questions were included in my survey to determine what type of disability respondents had: The first asked about sensory-motor dysfunctions and the second specifically asked what type of disability respondents had. In another example of efforts to improve internal reliability, questions about satisfaction were distributed throughout the survey.

External reliability “deals with whether or not another researcher, undertaking a similar study, would come to the same conclusions” (McKay, 2006, pp. 12-13). I chose to conduct surveys because questionnaires and surveys are often strong in generalizability, precision, and control over extraneous variables (Polit & Beck, 2004). They are often most appropriate for conducting needs assessments or for evaluations. However, surveys alone often fail to address a number of key questions such as how do people actually use the AT that is provided for them? Are they using the AT to their full potential? (Draffan, Evans & Blenkhorn, 2007). As quantitative research tends to decontextualize human behavior, incorporating qualitative research offers the opportunity for a richer understanding to a phenomenon.

Qualitative research generates data that intends to explore the human experience as it is lived and thus investigate complex phenomena that are difficult to measure quantitatively (Polit & Beck, 2004). It provides “detailed description of individual perceptions and experiences [and] enhance[s] quantitative measures of phenomena”

(Curry, Nembhard, Bradley, 2008, p. 1443). Information from qualitative research can be applied “to evaluate changes in health care delivery systems, educational systems or health care products” (Dempsey & Dempsey, 2000, p. 180). Qualitative design may be especially influential with audiences who are receptive to human experiences and feelings or who value narrative. Compared to quantitative research, however, there is less control and structure in qualitative research (McKay, 2006).

Producing Trustworthy Qualitative Data

For qualitative research, internal validity depends on what is referred to as credibility and external validity to transferability and these establish the trustworthiness or the quality of qualitative information (McKay, 2006). Techniques to improve credibility in qualitative research include: prolonged or intense engagement with the study population; triangulation (i.e. using multiple methods to collect and interpret data so as to converge on an accurate representation of reality) of sources, methods, and investigators; feedback and discussion with the population to help in finding possible paths for the interpretation of findings; and peer review (or debriefing)/member checking, as well as the use of direct quotes (McKay, 2006; Polit & Beck, 2004). For my study, the audio-taped interviews were transcribed verbatim and verified by myself as well as the interviewees. Interviewees received a copy of their interview transcript via email and were invited to review and revise the transcript. To establish intercoder reliability, my supervisor and I, operating independently, coded a sample of the interview data. Subsequently, we came together to review and agree upon my coding decisions.

Threats to transferability in qualitative research include: selection effects (where constructs selected are only relevant to a certain group), setting effects (where the results are largely a function of their context), and history effects (occurrence of events outside of the study that are not comparable and can affect outcomes) (McKay, 2006). I was mindful of any biases that may affect the research process and conclusions, so that the external validity of my study would be increased.

Method

This section is separated into survey method and interview method, describing the development of tools (survey and interview guide), recruitment of participants, how data were generated and how data were analyzed. Then, ethical considerations in administering the surveys and interviews are discussed.

How data were generated.

Quantitative data were generated from surveys of adult consumers with vision, hearing, mobility, learning or other disabilities, located throughout the province. Surveys were anticipated to allow greater access to end users across the province making the sample more geographically diverse. A survey was more feasible in terms of my available time and financial resources than focus groups or individual interviews with end users from across the province. The intention was that the data from the surveys "could be used to gather descriptive information about the characteristics of the community or organization so that qualitative findings could be understood in a broader context" (Polit & Beck, 2004, p. 283). Because of the anticipated size of the sample, the sampling method, and the challenges some end users would face in completing the surveys, the survey data

were expected to be descriptive rather than generating findings through more advanced statistical testing and analysis.

Qualitative data were generated from individual interviews with a number of service providers located throughout the province (e.g. professionals in the post-secondary setting, disability service providers and coordinators in community-based organizations, as well as employment program managers). One-to-one interviews are much more efficient and manageable than trying to organize a focus group around the schedules of multiple service providers in various work sectors and across a large province.

Focus groups provide quick results, generate complex data at a low cost, in a short period of time and can be used with various populations in diverse settings (Polit & Beck, 2004). They help to identify group norms and cultural values, and facilitate the expression of ideas and opinions that might otherwise be omitted from a one-to-one interview. Sometimes, however, there are challenges with accessing participants and providing accommodations for the focus group to ensure the quality of data generated from this group. These modifications can be costly and time consuming. Challenges with transcribing may also arise, and are often related to technical difficulties, such as the placement of the microphone, and having several participants speaking at once, so that all group members are not recorded with equal clarity (Polit & Beck, 2004). Overall, focus groups are not simplistic, but they can certainly be worthwhile, especially when trying to implement change in health services. Focus groups are comparable to interviews in that they generate a similar number of ideas (Polit & Beck, 2004).

Stakeholders were purposively selected because they had an ability to describe the context for AT services in their part of the province, and share information about any key services in operation (government and non-government funded) that are related to AT. Interviews with front line staff were chosen to give their perspectives, as they differ considerably from those of directors, administrators and policy makers who are not on the front lines and do not deal with the issues on a daily basis. Fact finding and anecdotal statements from organizational representatives have affirmed that they have a deep appreciation for the issues of importance surrounding this topic of AT service provision for individuals with disabilities. I met with a central government official of a government department responsible for people with disabilities and this was helpful to inform the planning stage of my data collection because “policymakers will know where the gaps and inadequacies in policy are and what the political climate is in systems and institutions” (Kirby et al., 2006, p. 48).

Survey instrument.

The survey (Appendix C) was developed to collect data about AT use, barriers to accessing AT, user satisfaction with AT, how AT contributes to independence, and consumer socio-demographics. The language, styling and format of the survey questions were inspired by two previous AT-related surveys: the Quebec User Evaluation of Satisfaction with assistive Technology (QUEST) version 2.0 and the Massachusetts Rehabilitation Commission Survey of Assistive Technology. Questions were used from both with permission from the authors. Survey questions were modified to make it particular to Newfoundland and Labrador and two open-ended questions were added at

the end of the survey to gain a better sense of what difficulties people in this province had in obtaining AT and asked if they had any recommendations for change.

The QUEST 2.0 is a 12-item questionnaire used to assess an individual's level of satisfaction, on a 5-point scale, with a wide variety of AT (Demers, Weiss-Lamvrou & Ska, 2000). Each of the satisfaction items were rated on a 5-point Likert scale, indicating level of satisfaction with the aspect of the device or service, with 5 indicating the maximum satisfaction and 1 indicating the minimum satisfaction. The QUEST has been found to be a valid tool for evaluation of user satisfaction with AT (Demers et al., 2000). Client satisfaction levels with current AT is measured using eight items related to the actual device (dimensions, weight, adjustments, safety, durability, simplicity of use, comfort, and effectiveness) and 4 related to services. (service delivery, repairs and servicing, professional services and follow-up). The QUEST was developed for use with a wide range of AT devices and not all items are relevant to every device. According to the authors of the QUEST, the validity of the tool is not compromised if six or fewer items are missing. According to the literature review, limited applications have used the QUEST as a measurement of satisfaction with computer-related AT (Derosier & Färber, 2005). However, the use of the QUEST items was the most applicable for measuring users' satisfaction with their most recently acquired assistive device. The QUEST has been described as "the only broadly used and well validated instrument to assess satisfaction with assistive technology," and one of its strengths is that it concentrates on the perspective of the user (Wessels et al., as cited in Hill, 2007).

Samuelsson and Wressle (2008) also conducted a study on user satisfaction with AT, concentrating on mobility devices, using the QUEST instrument as well. They decided to use the QUEST 2.0 tool as it is reputable in measuring user satisfaction with AT. However, they did point out that the QUEST 2.0 does not include any questions about user characteristics such as age, living conditions, use of the device or the effects on activity and participation. They used an additional questionnaire to obtain this information and this procedure is followed in my study. Also because it relies solely on the user, the opinions of other stakeholders are not considered, my study was supplemented with key informant interviews.

The Massachusetts Rehabilitation Commission Survey of Assistive Technology is a 41-item survey intended to provide ongoing feedback on and assess the impact and effectiveness of the activities of the Massachusetts AT Act Project (MRC, 2006). The survey was designed to assess the demographics of those accessing AT services, their satisfaction with AT services, their unmet AT needs, and a host of other data and issues critical towards gauging the success of the comprehensive State Plan for AT (MRC, 2006).

The survey adapted for this study consisted of 45 questions in total, including Likert scale questions, multiple answer questions, close-ended and open-ended questions, similar to the MRC survey. The actual number of questions a respondent answered varied depending on their responses to previous questions. The first section included questions for all respondents about sensory motor dysfunctions and types of disabilities respondents, as well as employment status, community involvement and living situation.

The next section included multiple Likert scale items on current AT utilization, how AT contributes to various areas of daily life and questions about particulars such as who pays for the AT, barriers to acquiring AT and familiarity with AT programs in NL. User satisfaction with the device they had most recently obtained is measured using Likert scales from the QUEST survey instrument. In order to describe the users' health status, a single response question on self-reported general health was used.

Section three included single response and Likert questions about an AT recycling program, an AT lending program and an AT demonstration centre. If respondents had accessed such a program/centre, they were asked to rate their satisfaction with various aspects of the programs/centre on a scale of 1-5 (1 being *not satisfied at all* and 5 being *very satisfied*) and to identify any barriers they had with accessing such programs/centre.

To examine the potential impact of an SEP system in Newfoundland and Labrador, respondents were asked to choose how likely they would be to use or benefit from components of an SEP (e.g. recycling program, lending program, demonstration centre, toll free hotline, and electronic information). This approach was chosen so that people would expand on their responses with more than just a 'yes' or 'no' to an overall SEP.

They were also asked to rate the programs/centre in order of importance, how far they would travel to access an AT demonstration centre and if they would be likely to use an AT hotline, if one were available. Most questions were closed-ended with an option to provide an "other" response in some areas. There were two open ended questions near the end to provide additional information on their experiences with acquiring AT, and to offer recommendations for improving AT services to people in NL. The fourth set of

questions collected personal and socio-demographic information about respondents, such as region of residence, gender, age, and household income.

Pilot testing.

While the reliability and validity of the QUEST has already been demonstrated (Demers et al., 2006), the content validity of my survey was established in consultation with my four-member supervisory committee. A pilot study was conducted during the months of December 2008 and January 2009 with 12 people from various backgrounds (e.g., disability service providers, researchers/non-researchers, users and experts of AT). Based on the feedback from the pilot test, content was clarified and extensive changes were made to the wording of questions and the survey procedures. Also, as a result of the high rate of missing responses to some items, the instrument was shortened and its language and structure simplified to facilitate complete response by a broader audience.

Feedback was sought from the national CNIB office and the Blundon Centre of Memorial University of Newfoundland (MUN) to ensure that my recruitment methods and survey met accessibility standards. In addition to having a hard-copy for distribution, An online survey was created using Survey Monkey. This software is compliant with Section 508 (2008) - a law that outlines standards that make online information and services accessible to users with disabilities. These standards ensure keyboard access for mobility impaired users, color contrast for users with low vision and alternative content for visual aspects of the site so that assistive products, such as screen readers, can easily access and translate information to users.

Survey recruitment.

Local community organizations were contacted via email (see Appendix D for letter of recruitment) and asked if they would assist with recruitment by informing clients/consumers about the survey. These organizations included a balance of the East, Central, South, North and West parts of the province, of urban, suburban, and rural areas. In an effort to generate an exhaustive list of provincial organizations, various staff members of MUN who had previously conducted disability research were emailed for suggestions about populations. Before any recruitment was initiated by these organizations, ethical approval was sought from their respective boards.

Ethical considerations.

Approval from MUN's Human Investigations Committee (HIC) was received on May 22, 2008 to conduct this research (see Appendix E). Amendments to the survey were submitted and approved twice during the research process, the consent forms (see Appendices F and G) were amended once and approved, as was the poster (Appendix H) and the list of organizations/institutions and service providers.

There is always an assumption that possible harm may occur from a study involving human participants. Many in the disability community have expressed that they feel "over-researched" (The Centre for Research and Education in Human Services, 2007, p. 32). However, it was judged by several ethics boards that this research project posed no harm and may contribute in a positive way to improved services for people with disabilities.

Organizational partners that facilitated recruitment included:

1. Office of Employment Equity for Persons with Disabilities (Government of NL),
2. Learning Disabilities Association of NL (LDANL),
3. Ability Employment, Community Employment Corporation,
4. Canadian Institute for the Blind (CNIB),
5. Independent Living Resource Center (ILRC),
6. Canadian Hard of Hearing Association of NL (CHHA-NL),
7. Canadian Council on Rehabilitation and Work (CCRW) - Partnerships for Workplace Inclusion Program (PWIP),
8. Newfoundland Coordinating Council on Deafness (NCCD)
9. The Commons (through Distance Education and Learning Technologies (DELT) at MUN,
10. College of the North Atlantic (CNA),
11. Sir Wilfred Grenfell College, and
12. The Blundon Centre

Organizations informed current or former clients/consumers via email, by posting a link to the survey on their website, or advertising it in their newsletter. Posters were distributed to organizations to post at physical locations (CNA campuses throughout the province, The Blundon Centre, CHAA-NL) to recruit individuals who may otherwise have been missed. The poster included my contact information in the form of pull off tabs.

Individual contacts within the organizations helped by telling potential participants about this study and sometimes handed out surveys and cover letters to clients, along with a prepaid, self-addressed envelope.

The Department of Human Resources, Labor and Employment (HRLE), through the Government of NL, distributed my cover letter and survey to a list of clients who were funded under the Labor Market Agreement for Persons with Disabilities. The Department sent the cover letter and survey link to all Client Service Managers at 16 Career Work Centres across the province, and asked them to offer active clients an opportunity to participate in the survey.

No incentive was offered to respondents for their participation. A reminder email to the organization who had volunteered to help recruit was sent out a few weeks following the initial mailing. A snowball convenience sampling method was used to recruit respondents for the survey. As a result, a response rate (control) was traded for extra data. In disability research, a response rate is not always reflective of a lack of interest in the research, but may be a result of various issues, such as accessibility formats or hesitation to disclose a disability.

Participants for both the surveys and key informant interviews were provided with an informed consent form. In addition to inviting participation in the current study, the consent form defined what AT is and explained the purpose of the research to assess peoples' knowledge of, and experience with, AT services in Newfoundland and Labrador (NL). Also, it was explained that the results may contribute to future policy decisions for AT services in NL. The consent form for the survey participants specified that it would possibly take up to half an hour to complete the survey. This allotment of time was in consideration of people with reading and/or writing difficulties, who required more time

to complete the questions. For the interview, respondents were informed that it could take up to two hours and that responses would be audio-recorded with their permission.

Both versions of the consent form stated that, if a participant wished to terminate his/her participation in the study, and remove any data they contributed, then he/she was free to do so. It also explained that consent forms/records would immediately be kept separate from the actual data and no identifying marks would be placed on either of the surveys or the interview transcripts. Contact information for the Principle Investigator (me) and a third party (the HIC), was also provided to the participant, in case further information was required.

Survey participants and sample.

Prerequisite criteria for survey participation required participants to be between the age of 19 years and 65 years, have a self-identified disability (mobility, agility, vision, hearing, learning, or other) and have experience with AT. Data collection with surveys began December 1, 2008 and ended April 23, 2009. Thirty-five survey questionnaires were hand-delivered between December 2008 and March 2009 with pre-paid envelopes to various organizations and people with disabilities in and around the St. John's area. Ten survey questionnaires were mailed out to employment corporations on the west coast of the province. Of the 45 surveys mailed out, a total of 19 were returned by the cut off date. One of these was not included in the calculation due to incomplete information. Three surveys were administered over the phone at the request of respondents with visual disabilities. The cut-off date was extended to optimize data collection. Using the web-based survey, 39 respondents submitted responses. Of these 39, 11 surveys were omitted

from data analysis because of missing information. In all, there were 49 completed paper and web-based surveys.

Quantitative data analysis.

Analysis of data obtained through the surveys involved descriptive reporting of frequencies and percentages of study variables as well as tests to compare certain variables according to their distribution (e.g. chi-square tests). Overall satisfaction was calculated by adding the ratings of the valid responses (responses scored as 'not applicable' were not included) and divided by the number of valid responses. Cases with more than three quarters invalid item responses were scored as invalid as recommended by Demers, et al., 2000.

Samuelsson and Wressle (2008) also used QUEST and quoting Demers et al. (2000) reported that besides item-by-item analysis, the means for the sub-scale scores can provide useful summary statistics about the relative satisfaction or dissatisfaction of the device and services dimensions - the users who report that they are 'more or less satisfied' or less (scores 1,2 or 3) could be treated as one group and those who are 'quite satisfied' or 'very satisfied' (scores 4 and 5) as another group and they could both then be compared according to percentage.

Construction of the interview questionnaire.

A review of the literature was used to formulate the set of questions for the semi-structured interview (Ringaert, 1997; Mendez-Libby, 2000). An interview guide was developed for key informants (see Appendix I) which included questions about the needs and service delivery issues related to AT in their areas, what resources are available to

solicit and obtain funding for AT, availability of training and their level of training, and their opinion of the current level of AT service delivery. The survey also asked about the barriers to receiving and using AT in their areas, strategies for addressing barriers, and what their concerns were about the present system of delivery (i.e. assessment, procedures, length of time, etc) for AT devices, services and supports. Finally, it asked what recommendations they would suggest be made in the area of AT provision for NL and how they would rate the importance of an AT reutilization program, a lending program and a demonstration centre for the province.

Recruitment for interviews.

Input from lead service providers and ministerial staff from across the province, helped to generate a list of key informants. Purposive sampling was used to select service providers working in pivotal locations with rich knowledge and experience. The sampling approach is essentially “theoretical” since the aim is to select participants based on certain characteristics or criteria determined by the research purpose and which help to develop and test a theory or argument (Mason, 2004). Between October 2008 and March 2009, a total of 10 potential key informants were approached to participate in interviews, and 8 agreed (see Table 7). The two who declined felt that, they would not be suitable to inform my research because they did not directly provide services. Many participants felt it was very important to address AT-related issues, and they were enthusiastic about participating in the study.

Table 7

Number of interviewees and where they provide services in the province

Participant	Region			
	East Coast	Central	West Coast	Labrador
1	X			
2	X			
3	X			
4	X			
5		X		
6			X	
7			X	
8				X

The interviewees had an average of 11 years experience between them, ranging from 2 to 27 years experience working within the field of disabilities. There were two AT consultants from community organizations, two disability services coordinators from post-secondary institutions, one manager of an employment centre, one president of a provincial advocacy organization, and one student development officer.

Interview procedures.

Potential participants were approached by e-mail and provided them with an information sheet about the study (see Appendix J), and the interview guide beforehand. This was followed up by telephone to confirm participation and schedule interviews. Interviews took place in a mutually agreeable location (e.g. in person in coffee shops, at the workplace, and over the phone).

One-to-one interviews were audio taped to ensure accuracy of the data and ready accessibility to other members of the research team. Transcription of the interviews took

place shortly after the interviews were conducted so as to ensure that all data were intact and included in a standard master data set (Curry, Nembhard, & Bradley, 2009).

Qualitative content analysis.

The most widely used method of qualitative analysis is to 1) develop a categorization scheme, and 2) code data according to categories (Polit & Beck, 2004). For text-based data, the most commonly used method of organization is the cross-sectional indexing system, in which the same set of indexing categories are devised for use, cross-sectionally, across the entire data set (Mason, 2004).

The data were analyzed using a systematic procedure of coding to categorize and understand the data that emerged as themes and categories from the interview data. In order to develop my categorization scheme interview transcripts were read twice, noting important concepts that were present in the text. A categorization scheme was developed by grouping related concepts together. Colors were then assigned to the various categories and the transcripts were read a third time, highlighting passages (bits) that corresponded to the chosen categories. Therefore, an early step in analyzing my qualitative data was to develop a categorization scheme by organizing and indexing the data, then coding the data according to the categories that emerged. This made it more manageable for retrieval and review.

Recruitment Challenges

Accessing sample populations.

Recruiting post secondary students was more challenging than I originally anticipated and this delayed progress with gathering survey data. One postsecondary institution was

undergoing a major transition in staff and my request to access their student population was frequently passed from one individual to another. As a result, staff members were misinformed about the purpose of the research and numerous clarifications were required. Ultimately, the organization refused to send out an e-mail notifying students and staff about the study or to distribute my survey. They indicated that this decision was intended to protect students or staff with disabilities from being identified or singled out. The organization did grant permission to post a flyer on their bulletin boards and acknowledged that this was a very passive form of recruitment, and would probably not result in participation of many students.

This response was unfortunate because it may have addressed questions about integrating AT into a postsecondary institution with campuses across the province. The potential data from this population would have been important in demonstrating the value of AT and the needs of students with disabilities in post secondary programs. This response contrasted significantly from other community organizations I contacted, who took a progressive approach by collaborating in this research that aimed to improve disability service delivery and policy in the province. Although many disability service organizations in the community agreed to take part in my research, there were community organizations who were initially a little hesitant to participate and considered the request for several months before agreeing to participate and help recruit participants. Ultimately, we were able to work together to gain input from their consumers.

Survey distribution.

Posting the surveys also presented challenges. I was unable to avail of postal services through the Department of Graduate Studies and had no choice but to mail them out using regular postal services. This proved cumbersome, especially when survey packages had to be mailed out and weighed as is for the pre-paid return envelopes. This was further complicated when postal charges changed in the beginning of the new year and some completed surveys may not have been delivered back to me due to insufficient postage on the self-addressed self-stamped envelopes. At least 10 surveys were not received, possibly due to a lack of a return address on the first mail out of surveys.

Lack of graduate student work space.

Lack of a designated student work space to conduct interviews and administer surveys, interfered with my ability to offer a convenient and professional set up when collecting data. Other options such as a home phone or cell phone were not suitable for a variety of reasons. Potential respondents may have hesitated to call a personal cell phone number to provide their confidential information. Cell phone conversations may be overheard or intercepted by individuals using scanners or other devices. This may have been a deterrent for interviewees and survey respondents who were concerned about the privacy and confidentiality of their information.

Summary

The methodological framework and approaches used in this study, as well as the methods employed in collecting and analyzing data helped to generate trustworthy data. In addition, the ethical considerations and recruitment challenges in conducting this research

was a valuable learning experience and spoke to the nature of conducting research with consumers and service providers of disability services. The next chapter will begin the presentation of findings. I have separated the findings into two chapters. The first set of findings is from the surveys with consumers.

Chapter 6 – Survey Findings

The current conditions, practices and factors related to the implementation of AT services in NL were the main issues that guided this research. The principal goal was to assess satisfaction and perceived need for AT devices and training in this province. More specifically, analysis of the data derived from the surveys was aimed at determining the feasibility of having increased AT support services in NL. In the following sections, quantitative findings are presented from a survey of end users (consumers) of AT, using descriptive statistics, cross-tabulations (herein referred to as crosstabs), and chi square analyses. These findings will be represented using charts and tables that show relationships and trends among the variables.

Socio-demographic Characteristics of Survey Respondents

Descriptive statistics were performed on the survey data. Socio-demographic characteristics of survey respondents – gender, age, household income, urban or rural residence, employment status, enrolment in postsecondary - are shown in Table 8. A sample of 49 consumers was collected and comprised of 26 females (53.1%) and 23 males (46.9%). The mean age of the entire sample was 35.26 years (ranging from 19 Years – 58 years). The largest group of respondents in terms of age was 26-35 year olds, representing 30.6% (n=15) of the sample. When asked about their living arrangements, the majority (67.3%, n = 33) of survey respondents reported living with a partner/spouse/family member. Fewer (22.4%, n = 11) were living alone, 8.2% (n = 4) were living with roommates, and 2% (n = 1) were living with a partner or roommate.

Table 8

Socio-demographic characteristics of survey respondents

Socio-demographic characteristic	<i>f</i>	%
Gender		
Female	26	53.1
Male	23	46.9
Age		
19-25	10	20.4
26-35	15	30.6
36-45	12	24.5
46+	10	20.4
Missing	2	4.1
Employment status		
Employed full-time (30 hours or more per week)	23	46.9
Employed part-time (less than 30 hours per week)	2	4.1
Enrolled in College/University	17	34.7
Unemployed	24	49
Able to work but not currently	17	30.6
Unable to work due to disability	4	8.2
Unable to work for other reason	4	8.1
No response	1	2.0

Table 8 is continued on the next page . . .

Socio-demographic characteristic	<i>f</i>	%
Household Income Level		
10,000 or less	12	24.5
10,001-30,000	15	30.6
30,001-50,000	10	20.4
50,001 -70,000	3	6.1
70,001-90,000	3	6.1
More than 90,000	4	8.2
No response	2	4.1
Volunteer in community		
Yes	28	57.1
No	20	40.8
No response	1	2.0
Urban/Rural		
St. John's and vicinity	39	79.6
Outside St. John's	10	20.4
Current Living Situation		
Living alone	11	22.4
Living with partner/spouse/family member	33	67.3
Living with partner and/or roommates	5	10.2

About half (51%, $n = 25$) were employed and 49% ($n = 24$) were unemployed. Of those who indicated they were employed, 23 reported full-time employment and 2 reported Of those who indicated they were unemployed, 15 reported they were able to work but not currently working (5 were looking for work, 2 were employed seasonally

and 10 were not interested in working at the moment). Four indicated they were unemployed because of their disability, three because of some other reason, and one respondent said it was because they were retired. Seventeen respondents (34.7%) were enrolled in college or university. The majority (57.1%, $n = 28$) of respondents participated in the community by doing volunteer work. The largest percentage of respondents reported household annual income of \$10,001 to \$30,000 (30.6%, $n = 15$) which is comparable to a national survey that reported an average income for adults with disabilities in NL as \$20,428 (Statistics Canada Can, 2007). An annual household income of \$10,000 or less was reported by 24.5% ($n = 12$) of respondents while \$70,001 or more was reported by 14.3% ($n = 7$) of respondents.

Similar to Hill (2007), in terms of geographic representativeness of the sample, the goal was to obtain an adequate sample to enable regional-level comparisons and to compare respondents who live in urban versus rural areas of the province. Due to the low number of responses and the concentration of respondents from the more urban regions of St. John's and vicinity, comparisons and broad generalizations cannot be made. The respondents were collapsed into two categories; those living in St. John's and vicinity (79.6%, $n = 39$) and those living outside St. John's (20.4%, $n = 10$) with representation from rural areas (6.1%, $n = 3$).

Difficulties and Types of Disabilities

In terms of difficulties or disability type, the frequency of responses to the questions "Do you have difficulty with any of the following?" and "What disability would you say you

have?" are shown in Tables 10 and 11. They could choose all conditions that applied and/or specify another sensory-motor difficulty or disability.

Table 9

Frequency of responses for sensory-motor difficulties

Do you have difficulty with any of the following?	<i>f</i>	%
Seeing	16	32.7
Walking	13	26.5
Remembering	12	24.5
Learning	12	24.5
Hearing	12	24.5
Lifting	8	16.3
Interacting with others	7	14.3
Thinking	7	14.3
Speaking	6	12.2
Listening (auditory processing)	6	12.2

$n = 49$ for the sample group (some individuals reported multiple disabilities, hence $f \neq 49$)

Table 9 which shows that 32.7% ($n = 16$) and 26.5% ($n = 13$) indicated difficulties with seeing and walking respectively, and in Table 11, the categories of visual and physical disabilities showed an equal percentage of respondents (28.6%, $n = 14$), which were also the most prevalent disability types in the sample. Another, prevalent disability type shown in Table 10 was hearing (20.4%, $n = 10$ respondents). Although only 14.3% ($n = 7$) indicated a learning disability, 24.5% ($n = 12$) indicated that they had difficulty

with both remembering and learning (prominent characteristics of a learning disability). Because respondents had the option of choosing more than one category of disability, there is some overlap between response categories indicating that some respondents had more than one type of disability.

Table 10

Frequency of responses for type of disability

What disability would you say you have?	<i>f</i>	%
Physical disability	14	28.6
Visual disability	14	28.6
Hearing disability	10	20.4
Mobility	9	18.4
Other (please specify)	9	18.4
Learning disability/ADD/ADHD	7	14.3
Speech or Language	3	6.1
Would rather not identify my disability	3	6.1

n = 49 for the sample group

Consumers' Self-reported Levels of Use of AT

Of the 49 respondents in the sample, forty-two respondents (85.7%) reported using or having AT. AT was defined for respondents as "anything that is bought or made that increases, maintains, or improves the abilities of people with disabilities, to help perform daily activities." A list of AT was provided for further clarification. As shown in Table

11, of the 42 respondents who reported using AT, 33 (78.57%) reported recently obtaining it. The most common type of AT recently obtained was sensory aids, reported by 45.5% (n = 15) of respondents. Second to that was computer aids, with a reported use by 36.4% (n = 12) of respondents. When asked how often they used their most recently obtained AT, 6.1% (n = 2) said they rarely used it, 27.3% (n = 9) reported using it often, and 66.7% (n = 22) said they always used it.

Table 11

Recently obtained AT and frequency of use^a

	<i>f</i>	%
Type of AT		
Sensory aids	15	45.5
Computer aids	12	36.4
Mobility/seating	3	9.1
Modified furniture	2	6.1
Environmental controls	1	3.0
Frequency of use		
Rarely	2	6.1
Often	9	27.3
Always	22	66.7

n = 33

Consumer Satisfaction with AT

The 42 respondents who reported using AT were asked to indicate satisfaction with their most recently acquired product using items from the QUEST 2.0 instrument. The survey incorporated seven items from the original QUEST sections assessing satisfaction with the AT device, and four items from the Services section as well as an additional subscale, for assessing satisfaction with how specific needs and preferences of the consumer were considered in the selection of that individual's AT. Given that this instrument was meant to assess a broad range of AT devices, not all items were applicable to every user and every situation; therefore a "Not applicable" answer option was added (Demers & Weiss-Lambrou, 2000). The web-based version of the survey required an answer option for "No answer"—these were coded as not applicable and missing and were excluded from the analysis. The original QUEST 2.0 asked respondents to comment on every response and to indicate the three product characteristics that are most important to them. These aspects were excluded from the current study due to the consideration of the time and effort required to complete the rest of the survey sections.

QUEST 2.0 yields three possible scores: device subscale score, services subscale score and a total score (Demers & Weiss-Lambrou, 2000). Responses were included as valid if they ranged from 1 to 5, where 1 was "Not satisfied at all" and 5 was "Very satisfied." Similar to Hill (2007), the subscales were altered slightly from the original QUEST instrument. In this study, the device subscale was calculated by adding the responses for items 1-7 together and dividing by the number of valid items in the subscale. Similarly, the services subscale was obtained by adding together responses for

items 8-12 and dividing by the number of valid responses. The total QUEST score was obtained by adding the ratings of the valid responses for items 1-12 and dividing the sum by the number of valid items. Scores ranged from 1.00 to 5.00 with two decimal places for scores between these minimum and maximum values. For the QUEST assessment to be considered valid, no more than 6 items (out of a total of 12) could be missing. For the device subscale, at least 5 valid scores needed to be present and three valid scores for the services subscale for a case to be included in analysis.

Overall Satisfaction with AT

Table 12 represents the minimum (Min) and maximum (Max) scores, means (M) and standard deviations (SD) for device, services and total scales for respondents who answered the question about satisfaction with AT. The mean satisfaction score for the device was 4.13, while the mean satisfaction score for the service was 3.52.

Table 13 shows that 58.3% of respondents reported overall satisfaction with their recently acquired AT. A crosstab between satisfaction with how one's preferences and needs were considered during the selection process and overall satisfaction with one's AT device revealed that 66.7% ($n = 10$) of respondents who said they were quite satisfied with how their needs and preferences were considered, also said they were satisfied with their AT. In comparison, 75.0% ($n = 3$) of those who said they were not at all satisfied with how their specific needs and preferences were considered during the selection phase, reported being "not satisfied at all" with their AT. A chi-square test between satisfaction with AT and satisfaction with consideration of needs and preferences did reveal a significant relationship ($\chi^2 = 36.114$, $df = 8$, $p < .001$).

Table 12

Device, service and total QUEST scale scores^a indicating satisfaction with AT

Device ^b	Service ^c	QUEST Scores	
		Total ^d	
Min.		1.86	1.25
Max.		5.00	5.00
M		4.13	3.52
SD		.79	1.14

^a Scale ranges from 1 (not satisfied at all) to 5 (very satisfied).

^b n = 32

^c n = 30

^d n = 36

Table 13

Frequency table for overall satisfaction with recently obtained AT

Satisfaction level ^a	f	%
Not satisfied at all	1	2.8
Not very satisfied	3	8.3
More or less satisfied	11	30.6
Satisfied ^b	21	58.3

^a n = 36 Although 42 participants used AT, only 36 reported satisfaction levels

^b Categories of "Very satisfied" and "Satisfied" were combined

Residence and Level of Satisfaction with AT

As shown in Figure 10, a crosstab was conducted between where respondents live (in and around St. John's versus elsewhere in the province) and how satisfied they were with their AT.

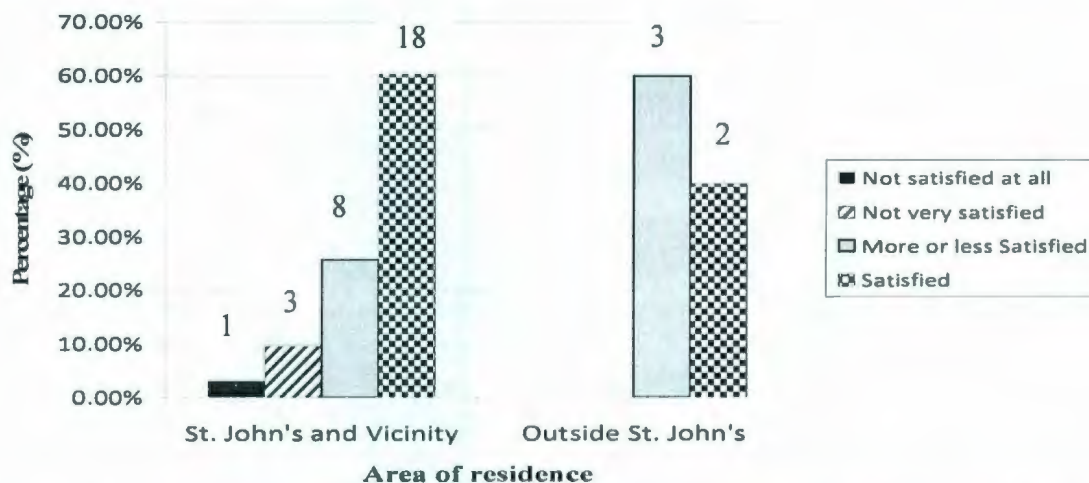


Figure 10. Survey respondents area of residence and their level of satisfaction with AT.

As the figure shows, the majority (61.3%, $n = 19$) of respondents from St. John's and vicinity reported higher satisfaction levels than those from areas outside of these areas. One respondent commented on the urbanization of services and supports saying that "Everything is pretty much in the St. John's area. There's not much help for people outside of the St. John's area. Very frustrating."

Level of Satisfaction with AT and Rate of Use

A crosstab between respondent's overall satisfaction rating of their recently obtained AT and their frequency of use of this AT was conducted. Figure 11 shows that 65.0% ($n = 13$) of respondents who reported being satisfied with their AT said they always use it.

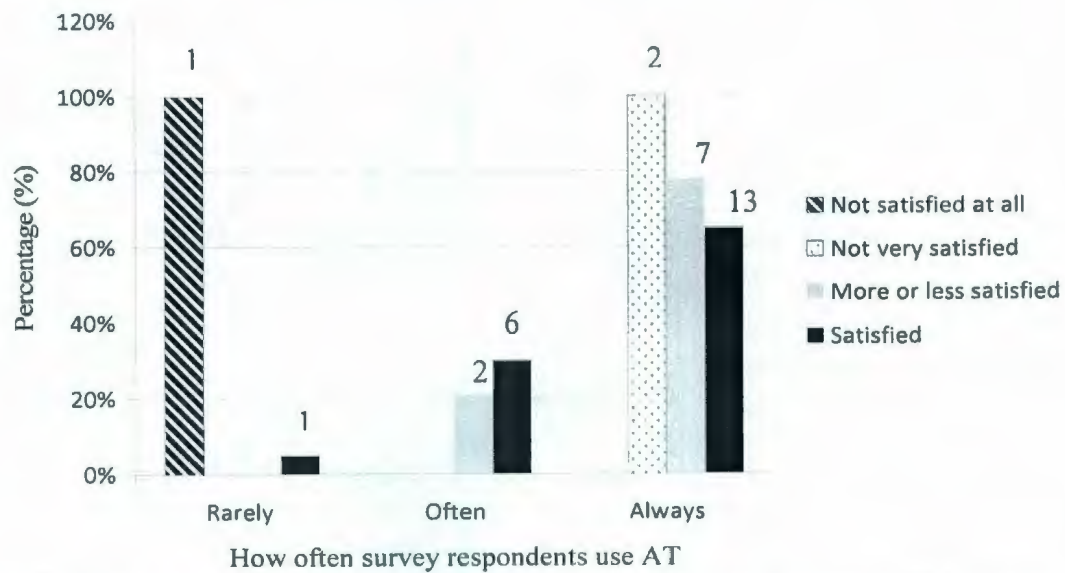


Figure 11. Satisfaction of survey respondents with AT and how they use AT. Numbers above the bars represent the number of observations.

Source of Payment for AT

The responses for those who answered the question about who pays for most of their AT are detailed in Figure 12.

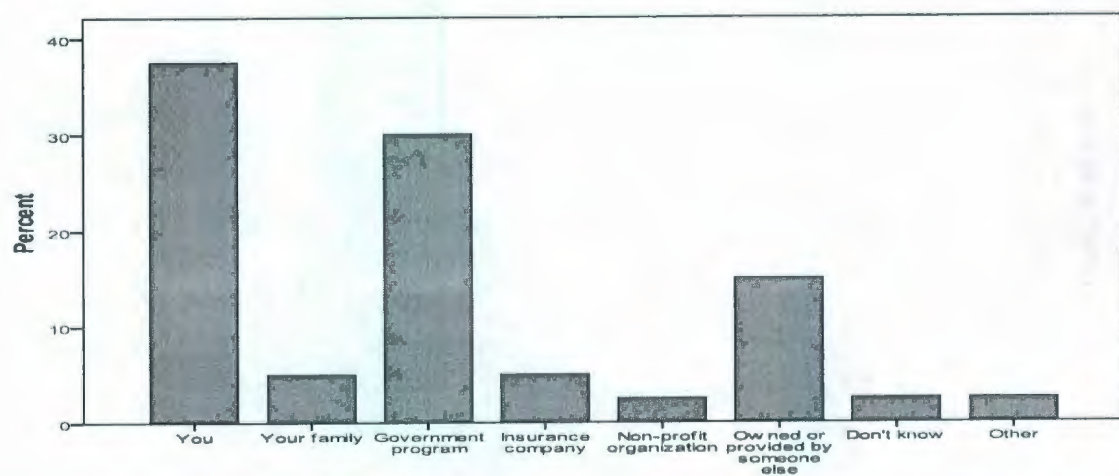


Figure 12: Who pays for all or most of consumers' AT.

Unmet Needs

Of the 44 respondents who answered the question about whether they had unmet needs related to AT, 45.5% ($n = 20$) indicated that there were AT devices they felt they needed but did not have; 36.4% ($n = 16$) said they had no unmet needs and 18.2% ($n = 8$) said they were unsure. A crosstab between unmet AT needs and who pays for AT revealed that 60% ($n = 9$) of respondents who paid for their own AT reported having unmet needs compared to 16.7% ($n = 1$) of respondents who had AT that is owned or provided by someone else (e.g. employer).

To determine which group expressed the highest rate of unmet needs, a crosstab was performed between unmet AT needs and disability category. People with a mobility disability expressed the highest need with 55.6% ($n = 5$) reporting unmet needs. Those with visual disabilities ($n = 6$) and those with learning disabilities ($n = 3$) expressed an similarly high degree of unmet needs (42.9%).

A crosstab was also performed between unmet AT needs and whether the respondent used/had AT. This revealed that 47.6% ($n = 20$) of those who used/had AT reported unmet AT needs versus 35.7% ($n = 15$) of those who used/had AT who did not report having unmet AT needs. More people who used/had AT reported unmet needs than those who did not use or have AT. 16.7% ($n = 7$) of those respondents who used/had AT reported that they did not know if they had unmet needs or not. A chi-square test was conducted on the variables of unmet AT needs and reported use/possession of AT and a significant relationship was found ($\chi^2 = 34.198$, $df = 3$, $p < .001$), indicating a significant relationship between unmet needs and whether or not people use AT.

Table 14 shows a crosstab between unmet AT needs and how often AT was used. Table 15 demonstrates that 80.0% ($n = 12$) of respondents who reported not having unmet AT needs always used AT versus 53.3% ($n = 8$) of those respondents who reported having unmet AT needs. A chi-square test between unmet AT needs and AT use did reveal a significant relationship between whether respondents reported unmet needs and how often AT was used AT ($\chi^2 = 31.434$, $df = 12$, $p < .005$).

Table 14

Cross tabulation of how often respondent use AT and if they report unmet AT needs

		Unmet AT needs		
How often does respondent use AT?		Yes ^a	No ^b	I don't ^c Know
Rarely	Count	2	0	0
	% within Unmet AT needs	13.3%	.0%	.0%
Often	Count	5	3	1
	% within Unmet AT needs	33.3%	20.0%	33.3%
Always	Count	8	12	2
	% within Unmet AT needs	53.3%	80.0%	66.7%
Total	Count	15	15	3
	% within Unmet AT needs	100.0%	100.0%	100.0%

^a $n = 15$ in the yes group

^b $n = 15$ in the no group

^c $n = 3$ in the I don't know group

Consumers Perceived Barriers to Using AT

Table 15 shows the frequency of responses for the 46 respondents who answered the question, in order of highest to lowest number of responses for each barrier to acquiring AT. The majority (71.4%, $n = 35$) cited the cost of AT as the most significant barrier to acquiring AT, followed by a lack of funding (49.0%, $n = 24$). Lack of technical support was also identified by a large number of respondents (34.7%, $n = 17$). Lack of training was cited as a barrier by 24.5% of the sample ($n = 12$).

Table 15

Barriers identified to acquiring appropriate AT to suit individuals' needs

Type of barrier	<i>f</i>	%
High cost	35	71.4
Lack of funding	24	49.0
Not enough technical support	17	34.7
Don't know what AT is available	13	26.5
Lack of training	12	24.5
Frustration using AT	10	20.4
Long insurance approval process	6	12.2
Purchased the wrong AT	3	6.1
Other:		
Attitudinal barriers	1	2.0

$n = 46$ respondents

The majority (four out of seven) respondents who reported not using AT cited barriers they faced in getting the right AT to suit their needs. All four people reported

high cost, lack of skilled professionals, and lack of awareness about what AT devices are available as barriers. These four individuals also reported annual household income levels of \$10,000 or less.

The theme of cost for AT was common in the responses to the open-ended survey questions about difficulties obtaining AT and recommendations for change. Respondents mentioned that there are often difficulties meeting government criteria for funding, and delays in receiving government funding for AT. This lengthy process was partly attributed to lags in response time from case workers, as well as mistakes to AT budgets.

Several respondents recommended that improved government funding is needed, similar to other provinces (e.g. Ontario, Quebec, Prince Edward Island, Saskatchewan, and Alberta) that have cost sharing programs in place to assist in the purchase of personal/household AT. For example, in Ontario, the province will reimburse an individual purchase of AT up to 80%. The price of some AT such as a CCTV was reported as being far beyond the financial reach of many individuals. Several respondents felt that a cost-sharing program would promote independence.

One respondent stated that in NL, funding for the purchase of personal/household AT is non-existent. This respondent also said that while there are some programs that providing funding for AT for education/employment, the criteria for eligibility is often very strict. It was made quite clear that more funding is needed as "student study grant[s] did] not cover everything."

Another respondent identified lack of AT awareness as a barrier and that convincing people that the AT was actually needed was a challenge. This respondent asserted:

[t]here definitely needs to be much more information made available regarding these devices. Employers need to be made much more aware of what is out there and why they should consider investing in such technology for their employees and what benefits they will gain from making such investments.

Similarly, another respondent wrote:

[a] computer opens up a new world for a person with a disability, but they can't get anyone to help them. They need help integrating into society; most every business is computer generated. There needs to be more public awareness.

Knowing what AT product would best suit the needs of individuals was cited as a barrier:

My major problem was with not knowing what product(s) would best suit my needs. Once I found the information I needed and was able to select a range of products, finding a local distributor with these products was a little difficult.

One respondent mentioned feeling "pressured to buy something that possibly isn't right for me." Within the recommendations made by respondents, the barriers were made even more apparent. Some of these recommendations were:

1. Have an opportunity "to look at an item and try it hands on before making that large purchase."
2. "Have [AT devices] more readily available for those who need it!!! We have enough hassles and things we have to fight for, why does this have to be one of them?"
3. "Have people available to do home visit when a problem arises with the AT."

4. "Perhaps a network whereby people can share their experiences about getting/using AT. An online forum perhaps? What better way of learning than through shared experiences!"

Perceived Barriers and Income

Figure 13 below shows that, of the 35 respondents who indicated that cost was a barrier in terms of acquiring AT, just over half (51.5%) reported household income of \$30,000 or less. A separate crosstab showed that for those who received AT, 30% (n=12) reported receipt of assistance from government programs and 15% (n=6) said their AT was paid for or provided by someone else (e.g. employer). Of the 37.5% (n=15) of respondents who reported paying for AT themselves, the majority (60%, n=9) of those reported unmet AT needs. Of those who reported having unmet needs, 35.0% (n=7) reported an income level of \$30,001-\$50,000; 25.0% (n=5) reported an income level of \$10,001-\$30,000; and only 10% (n=2) reported an income level of \$10,000 or less.

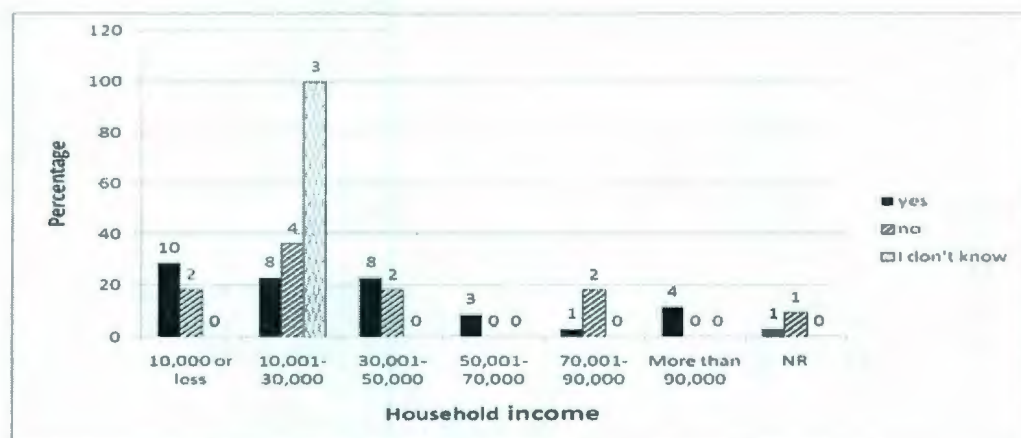


Figure 13. Household income of survey respondents and barrier of high cost. Numbers above the bars represent the number of observations.

Familiarity with Disability Organizations in NL

All respondents answered the question about their familiarity with disability organizations/agencies located in NL. A total of 38 respondents (77.6%) said they were familiar with at least one organization or agency in the province that provides AT services to people with disabilities. Table 16 is a frequency table displaying which organizations respondents were most familiar with. Less than half of the sample was aware that any one of these organizations/agencies existed. Respondents were most familiar with the ILRC (44.9%, $n = 22$), while they were least familiar with the NCCD (2.0% $n = 1$).

Table 16

Respondents' familiarity with disability organizations in NL

Organization	<i>f</i>	%
ILRC	22	44.9
CNIB	17	34.7
MUN Commons/Blundon Centre	17	34.7
CNA	12	24.5
LDANL	11	22.4
CHAA- NL	4	8.2
NCCD	1	2.0

$n = 49$ respondents

Self-Reported Health Status

Self-reported health status of respondents is shown in Table 17. Of those who responded 28.3% rated their health as excellent, 56.5% said they were in good health and 4.3%

reported poor health status. This remained consistent when the file was split and the output was grouped according to male and female categories 28.6% males and 28.0% females rating their health as excellent and 57.1% males and 56.0% females rated their health as good.

Table 17

Frequencies of self-reported health status

Self-reported health status	<i>f</i>	%
Excellent	13	28.3
Good	26	56.5
Fair	5	10.9
Poor	2	4.3

n = 46 respondents

Self-Reported Health Status and Unmet AT Needs

As shown in Figure 14, a higher percentage (93.75%, *n* = 15) of people who reported that their AT needs were met also indicated better health (37.5%, *n* = 6 as excellent and 56.3%, *n* = 9 as good) versus those who said their AT needs were not met (25.0%, *n* = 5 as excellent and 55.0%, *n* = 11 as good). While none of the respondents who reported unmet AT needs reported fair health, 15.0% (*n* = 3) of those who did report unmet AT needs rated their health as only "fair." A chi-square test between self-reported health status and unmet AT needs indicated that the null hypothesis of independence (that self-

reported health status and unmet AT needs are independent of each other) could be rejected ($p < .005$).



Figure 14. Self-reported health status and unmet needs. Numbers above the bars represent the number of observations.

A cross-tab between self-reported health status and how satisfied respondents are with how their needs and preferences were considered in the selection of their AT (one of the items on the device subscale measuring satisfaction) revealed that half of the respondents ($n = 5$) who were very satisfied reported excellent health, while 40.0% ($n = 4$) reported their health as good. For those respondents who reported being quite satisfied with how their needs and preferences were considered in the selection of their AT, 26.7% ($n = 4$) reported excellent health and 53.3% ($n = 8$) reported good health. More people who were satisfied with being involved with the selection process expressed good or excellent self-reported health.

Income and Living Situation

A cross tabulation between level of household income and living situation showed that 66.7% ($n = 8$) of those with a household income of \$10,000 or less lived with a partner, spouse or family member. Seven (46.7%) of those with household incomes between \$10,001 and \$30,000 reported living either with a partner, spouse or family member or with roommates. A chi-square test between these two variables showed no association between how much income an individual has in their household and where they live.

Perceived Impact of AT in Daily Living

Due to low cell numbers, the categories for "Agree" and "Strongly agree" were combined for the question which asked respondents to rate AT for its contribution to various life aspects (i.e. perceived impact of AT). The majority (59.2%, $n = 29$) agreed that AT contributes to various aspects of daily living (living independently, working, participating in the community, learning, and using computers and computer software). In the words of one respondent, using AT can "... improve education, work opportunities and day-to-day living and quality of life [and promote i]ndependence for people with disabilities!"

Figure 15 shows a chart based on the cross tabulation between perceptions of the respondents on whether or not AT contributes to their daily living and whether or not they feel they have unmet AT needs. It was found that 80% ($n = 16$) of respondents who agreed that AT contributes to daily life reported unmet AT needs. A chi-square test between respondents rating of how they feel AT contributes to daily living and unmet AT needs indicated that the null hypothesis that these two variables are independent of each other can be rejected ($\chi^2 = 26.80$, $df = 9$, $p < .005$).

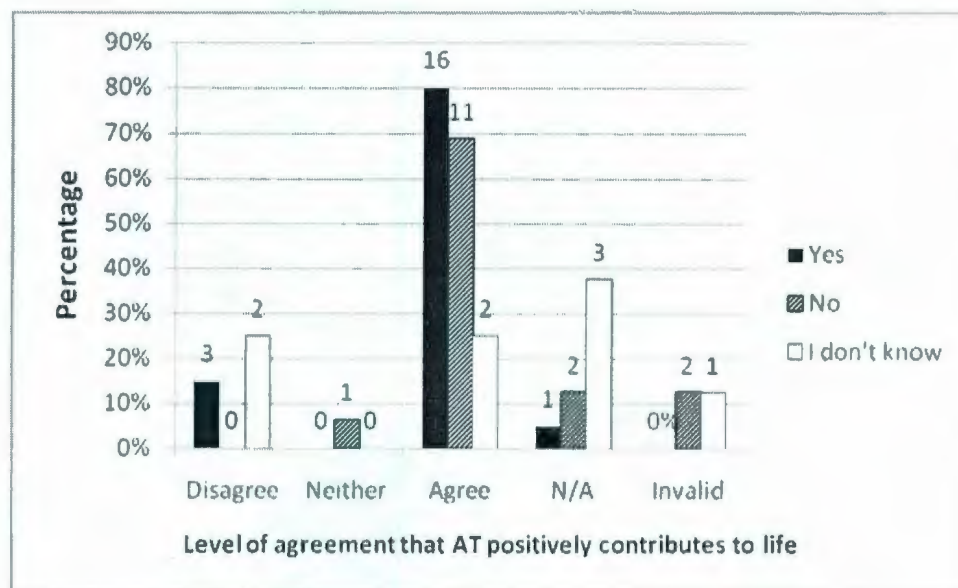


Figure 15. Perception of the contribution of AT to daily living and unmet needs.

Numbers above the bars represent the number of observations.

Recycling Program, Lending Program and AT Demonstration Centre

In section three of the survey, respondents were asked questions about their awareness, use and attitudes toward an SEP system and specifically about a recycling program and a lending program and an AT demonstration centre. Based on similar programs and centres throughout America, a reutilization program was described to interviewees as a system that allows someone to swap or repair, recycle or use second-hand AT devices, an AT lending program allows individuals to borrow AT devices for a short time and an AT demonstration center displays the newest AT devices and allows people to try them out with aid from technical staff. Regarding the Programs, 4.1% (n=2) of respondents said they had obtained or considered obtaining AT through a Recycling Program and 16.3% (n = 8) said they had obtained or considered obtaining AT through a lending program in

the province. The largest percentage (24.5%, $n = 12$) of respondents reported that they had used or considered using an AT Demonstration Centre.

When asked if they would recommend a program or centre to their friends, 38.8% ($n = 19$) said they would recommend AT recycling programs, 53.1% ($n = 26$) would recommend lending programs and 59.2% ($n = 29$) said they would recommend AT demonstration centres. Respondents were also asked to rate the programs and centre in order of importance to them by ranking them one to three. The AT demonstration centre received the highest rating with 42.9% ($n = 21$) of respondents choosing it as their first choice. Second was the AT lending program (24.5%, $n = 12$) and third was the recycling program (18.4%, $n = 9$).

The top cited reason that respondents did not avail themselves of such programs and centre was lack of awareness; 71.4% ($n = 35$) said they were unaware of recycling programs, 65.3% ($n = 32$) were unaware of lending programs, and 63.3% ($n = 31$) were unaware of AT demonstration centres in NL. There are programs in each category operating in some magnitude in the province. In an open ended response question, one respondent identified that "[t]here should be more awareness about recycling and lending programs."

When asked how far they would be willing to travel to get to an AT Demonstration Centre, the majority of respondents (69.4%, $n = 34$) said they would travel up to 1 hour and 12.2% ($n = 6$) said they would travel 1-2 hours. A large percentage of respondents (69.4%, $n = 34$) were interested in receiving regular news about AT and 55.1% ($n = 27$)

also indicated they would be likely to use a toll-free hotline that answers questions about a broad range of AT, if one were to be made available.

Issues of affordability, access to, and awareness of, AT dominated the focus of the open-ended questions, as illustrated by the quotations throughout this chapter and in Appendix K.

Chapter 7 - Interview Findings

Key informant interviews were conducted with a range of service providers in the disability community between October 4, 2008 and March 18, 2009. This chapter presents the findings that emerged during the semi-structured interviews. Key informants will be referred to as interviewees, respondents, or service providers throughout this chapter. The overarching theme from the interviews was a lack of consistency in the quality and quantity of AT information and in the number and availability of trained personnel. In particular, the following themes were identified from services providers in this study:

1. Awareness of AT is not widespread,
2. There are issues in the area of assessment and funding for consumers of AT,
3. There is a need for an AT expert in the province,
4. There is a lack of trained personnel in the province who can provide training and learning support on various disabilities as well as AT, and
5. There is no single entry point system for all residents of NL to access information on AT.

All interviewees acknowledged the benefits of AT to daily living and its contribution to independence of people with disabilities. They expressed a desire to learn more about AT for the sake of clients, consumers, and students with disabilities.

Awareness of AT

There were a few participants who strongly felt that the level of awareness of AT in the province was growing. One respondent commented that “when I started working in the

disability community, there was no mention of AT and now you see it on every corner kind of thing.” (St. John’s). With funding from the Department of Human Resources Labor and Employment (HRLE), the ILRC has placed a number of interns into communities and CNA campuses throughout NL, who have helped inform people about AT. They also deliver AT workshops upon request, for agencies seeking more information in this area. At CNA, the resource facilitators, especially at the Corner Brook and Gander campuses, have become knowledgeable on AT, with the help of ILRC interns and a great deal of independent learning. Interviews revealed that staff training on the AT is particularly focused on the resource facilitators “because they are working one on one with students. They are using the technology pretty much on a daily basis”.

The RFs then take it upon themselves to teach students and other CNA staff how to use the equipment. Based on the quote above, it was deemed crucial to interview a few resource facilitators from the various regions of NL.

To gain an understanding of individual service provider’s knowledge of AT, interviewees were initially asked about AT devices and services that exist at each individual’s organization/institution. A range of AT related equipment and services were reportedly available for use at the various organizations, from screen readers and magnification software to hearing aids, but in most cases, the respondents were unaware of what exactly they had and how to use it. All organizations/institutions had acquired some of the latest commercially available AT, however, there was an overall lack of knowledge about how to use it. One respondent said, “I honestly don’t know the name of it . . . I’m not familiar with it other than the fact that we have it there.”

AT awareness was found to vary among the interviewees. Respondents generally cited lack of information related to AT as a barrier to learning to use the technology. Those who were aware of the features and capabilities of AT frequently used their knowledge to improve effectiveness for users. These respondents identified that best practice in learning to use AT included being aware of what is available.

Many of the professionals/service providers said they were very interested in learning more about AT, but they found it difficult because they were unfamiliar with, and lacked resources in, AT related issues, trends, requirements, and advancements. As a consequence, they believed that clients, students, and consumers with disabilities were not informed of existing programs and services that may be available to help overcome barriers.

Several respondents spoke about their involvement with a White Paper on Public Post-Secondary Education. They explained that the White Paper directives included amendments to the legislation governing MUN and CNA requiring each institution to demonstrate a greater connectedness with each other, stronger accountability to the public and their contribution to the social and economic development of the province. The advisory board that was created for the Paper invited disability organizations (e.g. Newfoundland Coordinating Council on Deafness and Coalition of Persons with Disabilities-NL) to contribute. The Coalition of Persons with Disabilities-NL made recommendations for a more inclusive education system which included AT. Respondents identified that sharing information was critical to the awareness process around AT. This board of interested service providers, in an attempt to improve services

to students and clients, "talked about just developing... a dynamic resource on the internet of resources that are in all the different institutions so that you could know what's there, what can be used." Although the White Paper Advisory Board held great promise of providing a coordinated system of sharing information and support between community organizations and institutions providing services for people with disabilities, the Board disbanded after two years due to lack of funding.

Some key informants were concerned about the lack of consumer awareness of what AT is, how it can be obtained and how it is used. Many respondents felt that people are generally not aware of the available services or the potential of AT to help increase, maintain or improve people's ability to perform daily tasks. One service provider on the West coast of Newfoundland estimated that at least half of their clientele have:

no knowledge of assistive technology. And, it's only by us, doing one-on-one and saying 'You know, come into the office and look what we have that you can use, that you can avail of.' [we have] minimal training and very minimal knowledge [but] . . . we'll pass it on.

It was firmly believed that more awareness on the part of service providers and post secondary institutions would lead to more modern methods being implemented with clients and students. However, as one resource facilitator said: "Right now, the college's top priority is to provide testing accommodations, and one-on-one tutoring and support and learning strategies and that sort of thing ... some of these technologies is secondary."

There was also concern expressed that educators' lack of AT awareness is creating barriers for students. Participants believed that this lack of awareness has negatively

impacted students' ability to acquire accommodations. Key informants said that there were educators working at the post secondary level who were poorly informed about AT and were recommending more traditional accommodations (e.g. scribing or reader) but were not:

recommending the AT stuff . . . And the thing is, if it's not written and recommended on paper, then students have to go back and clarify that, in order for the people who may potentially be funding them to consider their application. (Eastern region)

Issues with Assessment

Lack of qualified people to conduct assessments was cited as an issue in the area of AT provision in NL: "Labrador, I think, probably only have two people in the whole region that performs some of these assessments . . . one in Goose Bay and one in Lab West." A consultant in the St. John's area revealed that assessments in high school are now being conducted by guidance counselors who are not necessarily trained in assessing students for disability supports. The issue was also raised about having to get reassessed for proper accommodations for when students enter post secondary:

They still have to go through complete assessment . . . the whole nine yards, and to me that doesn't make any logical sense. If it was working in a high school, [the student] was assessed in the high school, you know, so just carry through. It's a continuation of services. (Eastern region)

Lengthy time processes to obtain assessments and subsequent accommodations like AT, was also identified as an issue:

The waiting lists have decreased, but the waiting lists were two to three years the last going off . . . So a student would finish high school, and then have to wait two years before they went into another college, or whatever, and many times they would be waiting for the wrong service? (Eastern region)

Assessments for appropriate accommodations are made even longer when services are coordinated over long distances, as this interviewee indicated:

[O]ur disability services is one person who's not trained enough, who doesn't have enough awareness about the available resources. Any decision that she makes on what happens with a student has to go through the disabilities coordinator, who's located at a different campus. (Labrador region)

One service provider spoke about students who do not get assessed:

I think that like there's a big push that people can only get adaptive technology if they have documented disabilities, and there's so many people that fall through the cracks and they don't have the proper documentation . . . people don't keep documents for more than 10 or 15 years, and we have so many mature students coming through now. So that's a barrier itself. (Western region)

Another postsecondary staff member expressed a similar concern about the lack of assessments:

[A] mix of [mature] students coming into the college system that probably won't succeed because again all those barriers are there that... a high school student probably have had the assessment done. Somebody who's been out of school for

20 years, not much chance of them having the assessment, so where do you go?

(Labrador region)

Paperwork and bureaucracy were also cited as barriers to obtaining AT. One AT service provider stated that:

Consumers come in, and they're disgruntled and frustrated with systems and all the red tape they had to go through to further themselves and get ahead in their lives, and that's all they really want. They try to go to school, and . . . all the stuff that they had to go through to get that in place and to get it done on time and feasibly and comfortably – it's a challenge. (Eastern region)

Funding for AT was identified as a barrier particularly for students. Provincial and federal funding for AT often requires written documentation of a disability by a licensed professional. Such documentation for someone with a suspected learning disability or attention deficit disorder (ADD) or attention deficit hyperactivity disorder (ADHD), would require that the individual have a psycho-educational assessment. If provided with this documentation, the Canada Study Grant will reimburse 75% of the cost of the assessment to a maximum of \$1200 for post-secondary students. Interviewees commented that the awareness of such financial resources, especially the Canada Study Grant, is largely unknown to students as these pots of money "seem to be so tightly held onto. . ." One AT consultant spoke about the importance of students taking a proactive approach to seeking funding to purchase AT, such as a laptop computer and cell phone:

“I say to the students when they come in – if you can get some funding., no matter what it is, either through LMAPD or ... if you’re in on the EI system or if you’re on a student loan program, you should look.” (Eastern region)

For non-students, another option to avoid paying the exorbitant assessment fees is to contact Eastern Health and face a waiting list of one to one and a half years. One respondent in the St. John’s region recommended that “[t]here should be an umbrella group like the United Way with fundraising to generate funds properly which government will match usually.”

Need for an AT Expert

Several participants revealed the need to have an AT expert, a finding reported in the previously mentioned White Paper Advisory Board. Respondents said that having access to the right people and resources are very important to ensure that appropriate spending decisions are made with regard to AT. Although money appears to be available to purchase AT, the expertise needed to make appropriate purchasing decisions is not. Having an expert assigned to this area would be highly beneficial in NL as indicated by this service provider:

[We] need to have somebody who is very much an expert in AT because what we find is we have money to spend on [AT]; and if we don’t have students at that particular time requiring something specific, then we’re really just kind of looking [at] what looks good. And so we’re buying things, and we’re not always using them. And perhaps the money would have been spent better elsewhere. (Central region)

Another service provider in the post-secondary setting said:

You know, as a frontline staff member, I need somebody to go to [and] find out the information on certain technology pieces, whether that's outside of the college system, or whether that's inside the college system it doesn't really make a difference, but there really should be experts within these educational institutions.

(Labrador region)

Others suggested that the provincial government play a role in this by hiring an AT expert:

But if we had somebody at the provincial level, or even a couple of people, who really were into the assistive technology, this could help the post-secondary community [create] a secondary system. (Central region)

The perspective of many service providers in the disability community was that having access to AT resources and expertise would promote independence of all consumers, but especially students:

I think that would be really good because the more we encourage students to be independent, and the more they can rely on the technology the better off they are, absolutely. (Central region)

Access to AT resources and expertise would also increase productivity of service providers. One service provider on the west coast stated that before these technologies were available, resource facilitators had to transcribe and record materials for students; now the technology can be used directly by students, reducing staff time considerably.

Service Providers Understanding of Both Disability and AT

Key informants felt that it is critical to have knowledge about the various types of disabilities and AT. Learning how to use AT to work with a person's area of disability may increase understanding of disability and remove the fear and misconceptions that some people have about it. It may also eliminate barriers for people with disabilities. Some interviewees said their colleagues lacked understanding and knowledge in the areas of disability and AT. Concern was expressed that this lack of understanding and knowledge would perpetuate negative stereotypes and attitudes towards people with disabilities. The negative attitude of post secondary educators toward students with disabilities was identified by several respondents. One service provider from the postsecondary environment revealed that:

We have faculty members who just don't care whether [students] have a disability or not because they don't want to invest in finding out what those disabilities are, and what it actually means. When you say learning disability, it scares people. It shouldn't. (Labrador region)

Negative attitudes pose barriers to gainful employment and learning opportunities for people with disabilities. A service provider working with adult students in St. John's spoke about the importance of eliminating negative misperceptions about people with disabilities who are looking for gainful employment:

Although we talk about positive initiatives and getting the disabled into the system, believe me, anybody who's out there knows that as soon as anybody

knows there's a disability, unless they've got some personal linkages to it, they don't want it. (Eastern region)

Several participants felt that without training in disability, implementing any type of disability-related service, including AT, would be undesirable. One service provider made the point that:

The people that are here working in the industry now have years of experience and a wealth of knowledge just working with a lot of different types of individuals. So I wouldn't want to just see a new crop of students coming out who are really good adaptive technologists and don't have the experience behind them [in the area of disabilities]. (Western region)

Another agreed they would like to have contact with a person who is knowledgeable about various disabilities as well as AT:

I think it's really important that we have somebody who is very much an expert and can not only advise us if [we] have a student who has a particular disability ... but could also travel and work with students, work with people in the community. I know we have the ILRC, but that's in St. John's. And I know we have the CNIB here, but there is nobody who's based here who's available on a consistent basis, I don't think. (Central region)

AT Training and Technical Support

Lack of training and having appropriate AT support was a prominent theme across all interviews. When asked about the type of AT and the level of AT training for staff that was available at their agency/organization, responses varied from having absolutely no

training to having some training learning from a variety of sources (see Table 18). For example, Memorial University has a Department of Distance Education and Learning Technologies with a temporary staff person knowledgeable about AT. Students involved in the Undergraduate Career Experience Program sometimes do individual training tutorials at the St. John's campus or at the occasional AT Crawls (at an AT Crawl, students can move from station to station and receive a little demo on various AT). However, there is no permanent training set up at either of the MUN campuses in NL.

The ILRC, also located in St. John's, features a wide range of computer hardware and software all in a fully accessible environment. Anyone can come in and try out any piece of equipment to see what works best for them. The AT Coordinator at the ILRC is responsible for helping people use the equipment and finding ways to help consumers acquire it. This person's level of training and ability to provide technical support on AT is due to self instruction with credit also given to consumer knowledge base.

AT software for people with learning disabilities (e.g. Kurzweil 3000) was identified by five interviewees at the various sites, but only two of these were service providers who taught individuals how to use general and more advanced features, such as scanning documents. Some interviewees had contact with other AT service providers who provided some basic information and training about AT while others taught themselves through online tutorials, and webinars. Some relied on consumers' knowledge of AT. Without this informal support, many service providers felt they would have been at a disadvantage.

Table 18

AT related equipment and training at various organizations in NL reported by service providers

Organization	Level of Training	Training for consumers	AT available for use by consumers
College of the North Atlantic	- Self-taught RFs ⁱ - No formal training	- Provided throughout the Central area on an "as-needed" basis	JAWS ⁱⁱ , Kurzweil ⁱⁱⁱ , Dragon ^{iv} , close-circuit TVs (CCTVs), accessible resource rooms, one-handed typing tutor, hand-held magnifiers, recording devices, digital camera and carbon copy paper for note-taking
Blundon Centre/The Commons (MUN)	- Local training (e.g. ILRC, CNIB) - Webinars - "mostly a working knowledge"	- "AT Crawls" - No permanent training; Temporary staff and students provide training	Large print, screen reading and voice-activated software (JAWS, Zoomtext, Kurzweil, Dragon Naturally Speaking, Spark Space Learner ^v). CCTVs, a magnifier-mouse, keyboard overlays, ergonomic furniture, headsets
Community Employment Corporation (Port aux Basques)	- There is "absolutely nothing"	- No trained personnel to instruct how to use a computer or the AT available	CNIB keyboard, Read Please, "Job Readiness" room with a special keyboard and computer for internet use, videos, and a television
Independent Living Resource Centre (St. John's)	- AT coordinator with IT background but no formal training	- Training workshops - Informal training at the location in St. John's	Jaws, Dragon, Kurzweil, Sparks Space, Word Q and Speak Q, range of adaptive keyboards and mice, input devices, augmentative communication tools.
Coalition of People with Disabilities-NL (COD-NL)	- Does not provide AT services	- Does not provide AT services	- Does not provide AT services
NL Coordinating Council for the Deaf (St. John's)	- In-servicing by an audiologist twice a year	- No formal training	FM systems, Amigo system ^{vi}

ⁱ Resource Facilitatorsⁱⁱ A screen reader programⁱⁱⁱ For people with learning disabilities (LDs) or people with vision loss who have trouble reading^{iv} Used for dictating text instead of typing on a keyboard^v Concept mapping/brainstorming software program for people with LDs^{vi} Wireless amplification system

One participant captured it this way:

No formal training. I have a background in IT, which is a great stepping stone, but there's actually no specific training that I've taken to learn about adaptive technology – very much all self-taught, and we rely on people who use the technology to answer our questions, which is a lovely thing because we have a number of consumers that use certain programs in particular, and they're quite proficient with them, and quite willing to help out when I have questions (Eastern region).

Another participant in the Eastern area described receiving support from a vendor: "There is no training per se ... an audiologist comes to my office about twice a year. . . and he in-services me". This consultant also described the manuals that were eventually sent out to help instruct students using assistive listening devices (ALDs), as not being "a technical manual. The manual they gave us was written for a teacher in elementary-level schools. So it's written for little kids." He provided an example of when he was trying to set up an FM transmitter to the amplification system at the local university for a student doing a course there, explaining that he approached the "techie" at the university who took the technology, and was able to link it up directly, but that there had been no manuals for it at the time. The manuals arrived a year later. This consultant felt that "[companies] are putting out technologies as quickly as they possibly can . . . They're pushing it like dogs. They're charging a fortune for it, and they're not necessarily supporting it properly in terms of training."

One participant in the employment services sector said about the availability of training, there is "[a]bsolutely nothing. I don't even have it. And I'm managing the place. . . I just know it's on the system and that's it . . . I wouldn't know where to go and know where to start. . ." (Western region). In some cases, the lack of training for service providers means that the AT equipment that does get purchased becomes abandoned or obsolete. One representative of the disability community commented that "there was AT that was put out in the systems. It got dusty, and then old and outdated, and never did get really used." (Eastern region)

Generally, respondents felt that it was useless to have the technology without the training. Others found that if they were not using it on a regular basis, they did not retain the information they initially gained. One Disability Coordinator said, "[I] went to Stephenville to receive some training, but . . . by the time I might get around to working with a student, I had forgotten it because I wasn't using it on a daily basis." Many participants felt that having knowledgeable and trained staff was essential. For the AT to be successful for consumers, one participant suggested that training be focused on service providers, saying:

I would like to see some training put out there for the people who have been working already in the field for so many years, just more in depth so that they feel comfortable right off the bat with the technology, and the newer technology that's coming out in terms of the portability. (Western region)

However, one coordinator of disability services with a background in disability was not knowledgeable in AT and did not feel the need to receive AT training:

I know the more popular AT. I know to recommend to a student who may have a learning disability, a technology that will help, but I have not received a lot of training, nor have I requested the training because I'm not working with students often enough to retain, and I'm not using the technology. (Central region)

One Student Development Officer commented that resource facilitators "are severely under trained. . . part of it, I guess, is just being overwhelmed by the technology that's out there . . . it leads to the question, how much of a benefit is students going to get if the staff don't know about it?" This person went on to say,

It shouldn't be based on just the one individual source to go to. Like the instructor should be trained on how to use this, so they're aware of what their students will be using. You know, support staff and things like that should have at least a cursory training. (Labrador region)

Variance in training.

As indicated in Table 18, the level of training varied between the participants. Some respondents recognized the continuous learning curve with AT and one service provider reported being "so much more knowledgeable about it now, I feel really comfortable with the technology, and still there's so much to know ..." This was certainly not the case for all respondents on the west coast. Another respondent in that region stated "I wouldn't even know how to use it myself other than when I get time – hopefully – that I'd get a chance to research it, so I can show our clients." Another service provider rated his level of comfort with using the AT as very low (a two on a scale of 1-10), saying he had "a better understanding of disabilities in general than I do the technology."

For service providers and AT consumers in the more rural areas of NL, it was reported that there were no training services readily available in any region of the province:

I would assume there's probably a gap right across the board. I can't speak for the Avalon. And of course, [I'm] coming from the extreme end of the Island . . . there's probably a lot of assistive technology [on the east coast] and training available. I don't know. But I know on the west coast, there's absolutely nothing that I know of. (Western region)

The other service provider on the west coast explained that training is an independent process:

I research these items and we train the students on these items as needed . . . I would introduce them to [AT], and go through what kinds of AT we have. Have them use it with me there and see if they are comfortable with it and if not, provide more training.

One key informant commented that during staff transition, training new staff on AT was not a priority:

there's always a lot of staff turnover, so it's fine for me to know it today and I can teach some of the staff there how to use it. But, that staff could be gone tomorrow, so there you go again. Whereas if you have something accessible that you could tap into so that the service is there 24/7, that would be great. Because, otherwise, you are going to be continuously training your own staff. The same thing [applies] with anybody who [is hired] after me. (Western region)

The following quote expressed the accepted fact that knowledge of AT must be self-taught in NL and that service providers must make it a priority themselves:

There really isn't any formal training. When you start here at the college, you just kind of network with the other resource facilitators and trial by error, and then pass our knowledge between us . . . there's just a lack of training for people working in the field so that they can more efficiently pass on the knowledge of the different technologies to their students or to the people that they're working with within their organization. (Western region)

This self-taught method of AT training requires a significant investment of time on the part of the service provider:

I've been on a couple of these assistive technology [web sites] and they're wonderful – the information that they provide, the resources that they provide around product training is great; but unless you have the time, the energy and everything else . . . (Western region)

Some key informants felt it was not solely their responsibility to provide AT information and support since they had such limited knowledge. One service provider said: "We are not AT gurus here; that is not our job. It is mostly a working knowledge. It has to be, you know? We just don't have the resources here or the time to be an AT training site. There was some concern that the resource facilitators "aren't being utilized in the way that they should be. It shouldn't be about teaching [students]. That's the role of the faculty member. It should be about providing support [with the AT]."

When asked about the current level of AT Service Delivery in their area of residence or throughout the province, the responses varied. One respondent who regularly consults with people about AT commented that he did not “feel the services are as good as they were – I really don’t. There’s no central agency that’s sort of taking care of them, and it’s disjointed again . . . no one is coordinating them” (Eastern region).

AT Access

One prominent theme that emerged was that there is no centralized agency for AT services and supports. Participants were especially concerned about students’ lack of or poor access to AT:

There’s no center for students to go to like even to walk in and go online for some of these things, unless they physically go into somebody’s office; so, to me those are some of the issues that may be hampering the use of some of this technology.
(Labrador region)

Several informants commented on the need for a centralized training centre where individuals could go as an initial entry point to receive instruction and training on a wide range of aids and adaptations and receive technical support.

Everybody’s doing a little bit of something - CNIB, ILRC, LDANL, [MUN], Community Colleges - we’re all doing something. Is there a one-stop shopping? That somebody can go into and get an assessment, training, technical support, troubleshooting, a borrowing system like they have in B.C. (Eastern region)

Some interviewees talked about the importance of taking a broad approach to implementing AT services, for people with various or multiple disabilities to avail of AT.

One respondent said "I don't think that there's too many, if any, that do it from a cross disability perspective." Another proposed "a centralized hub . . . a training site, for service providers, for students, for people who are studying in university and become teachers. . . .And like a centralized service for the province." (Eastern region)

Some participants were unaware of the multiple sites within the province offering information and services for AT. One respondent revealed they were "not aware of any other organization that has any adaptive technology that they're sharing with the public aside from the CNIB." One key informant on the west coast supported the idea of a training and information centre specific to AT, saying:

There should be a body of people that actually look at the technology, and tweak it down to the bare bones where you've got the technology that really works and that is user friendly, and interfaces with different programs well, and goes through all those trial and errors that [everyone] probably goes through. . . that will cut down on the frustration for us, and for the students . . .

An employment services provider on the west coast of NL recommended that the Provincial Government, specifically the Department of HRLE should:

emphasize the need have training available for employers, managers, service providers and people with disabilities . . . set up a program so that there is regular training. I mean, technology's changing so fast, I mean, it needs to be a regular thing. It could be a full time job for people! . . . there's so many programs out there, I mean, it's hard for us to keep on top of it, so you can imagine . . . [t]he difficulties for someone with a disability, trying to understand . . . when before

you know it, there's another program there to, that's enhanced again further. . . . it could be a continuous, ongoing, type of training. . . . not necessarily with, just for the individuals, but for service providers . . . there definitely needs to be something there.

A key informant from the Labrador region recommended that a solution to ensure people have access to AT would be to develop a system for community access to AT similar to the Red Cross, whereby if you:

. . . need a wheelchair [because of] broken legs, you can go and use that resource. That same mentality should be in our community. Where you need the resource, it should be there for you to get no matter how much money you make, or how little money you make. If it's something you need to get through every day life, then to me it's no different than needing medication or anything else. It's just a part of what you need, so we severely lack that.

All interviewees enthusiastically agreed that a reutilization program, an AT lending program, and/or an AT demonstration centre would be beneficial for NL. Not all respondents were aware of existing programs or centres for AT in operation in the province. So, the same descriptions were provided to them as were given to the survey respondents (described in Chapter 6). The interviewees were asked to rate the programs and centre and their responses were overwhelmingly positive toward the concept of an AT centre. The general trend was to rate the AT Centre first, the Lending Program second and Recycling Program third. One respondent made the argument that:

Ideally, I think you can come up with a system that incorporates all three. I don't see any reason why not . . . I don't think it should be a matter of just between college campuses loaning it out. Again, you know, like it's around issues of the community, the college, the university. Those are three core components of success . . . (Labrador region)

Summary

In summary, interviews with respondents revealed several important themes that speak to the growing concerns of service providers who work in the field of disability and see the value that AT holds for consumers with disabilities. Respondents report that they encounter difficulty in accessing AT information to help make informed decisions regarding purchasing AT for their organization or for recommending AT for consumers. They also identified issues with assessment for an individual's disability which is often necessary so that a consumer can qualify for AT funding through Canada Study Grants or provincial government programs. Many respondents suggested having an AT expert in the province, and they further detailed that trained personnel in the province should be able to provide training and learning support on various disabilities as well as AT. Currently, there is no single entry point system that enables ready access to information on AT for all residents of NL with disabilities, regardless of their geographic location.

Chapter 8 – Discussion and Recommendations

Pulling together the themes presented in Chapters 6 and 7, this chapter makes connections between the attitudes and experiences of consumers with AT and the knowledge and ability of service providers to provide appropriate, timely programs and services to consumers. This discussion reveals the unmet needs of consumers and the awareness of service providers of such unmet needs. Consumers have indicated that they face barriers with acquiring AT, and with finding support to use it properly. Service providers have identified difficulty with assisting people with disabilities on using AT, because of their lack of knowledge and formal training on the AT equipment and software, programs and services. Throughout the chapter, I offer recommendations aimed at governmental and non-governmental agencies, educational institutions, health care professionals, and individuals concerned about access to and quality of disability services for people with disabilities in this province, in relation to AT.

Benefits of AT

This section highlights the many benefits of AT, especially for those with disabilities. AT is a means of enhancing a person's quality of life, allowing people with disabilities and their families to achieve a more satisfactory and resourceful lifestyle (Andrich, & Caracciolo, 2007). AT contributes to the independence, inclusion and full participation in society of people with disabilities (Szlamkowicz, 2007).

The majority of consumers in this study agreed that AT contributes to their life in many ways and service providers strongly asserted that AT facilitates independence among students and adults with disabilities. This confirms other research findings that

show how AT promotes the independence of students by providing “a situation whereby students become more independent in their learning processes” (Christ, 2008, p.31). Independent living is especially important in the health care sector as our province is aging rapidly. This aging population means more people will develop disabilities and will need assistance with daily living. With AT, people are able to live at home, which will reduce expenditures on home care and promote independence for people with disabilities. Other studies reveal that using AT promotes full participation in all aspects of individual’s daily life by reducing the impact of being limited in activities and enhancing functional independence (Szlamkowicz, 2007; Vincent, 2000). AT played a vital role in enhancing participation of individuals in my study in all aspects of society. For many, it boosted contribution in day-to-day life activities and social areas by enhancing personal relationships with family and friends. The findings of this study show that computer-related technology has even enabled expressions of emotions, thus enhancing the quality of life by enriching personal relationships. This enhanced quality of life has potential to influence health in a positive way. Technological development is one of the most promising ways of optimizing healthcare services to improve quality of life for individuals with disabilities (Szlamkowicz, 2007). Craddock (2006) and Langton and Ramseur (2001) demonstrated that AT levels the playing field with regard to finding and maintaining employment. Having employment and income is tied to people’s health, so this connection is important.

In particular, AT helped students in their educational pursuits, by providing a chance for them to complete their educational training on an equal footing with people without

disabilities. Students use of AT increased the efficiency of service providers at two postsecondary campuses in particular, significantly decreasing the time staff spent transcribing and recording materials for their students. For example, it was found that when students learned to use Kurzweil 3000 to self-administer their tests, a Resource Facilitator had more time to coordinate services (e.g. booking testing rooms) for other students. This finding demonstrated the benefit AT has had on increasing productivity of staff. Several service providers and campus administrators have commented on the exemplary services at these campuses.

It was clear from my findings that both service providers and consumers perceived the benefits of AT but expressed frustration at not getting the maximum benefits of AT. This finding provides evidence to decision makers in post-secondary and workplace settings in support of allocating future resources to improve services and capitalize on the benefit of AT.

Recommendation: College/university administrators responsible for recording goals and responsibilities, should ensure that the disability services coordinator responsible for disability services is in regular contact with consumer-based groups, or service delivery groups, to discuss the needs of students with disabilities who may benefit from using AT.

Unmet needs

In my study, it was found that more respondents who used at least one type of AT reported unmet needs than those who did not report using AT. This may imply that when people already have AT they may be more cognizant of the benefits of AT and know

which AT they require but do not have. Or, that people who use AT may have severe disabilities or comorbid disabilities that require additional AT.

More respondents who did not report unmet needs indicated always using their AT than respondents who did report unmet needs. This may mean that when people feel their needs are met, they use AT more often. This is clarified in the literature by findings affirming that those who report unmet needs may need improved or additional pieces of AT to pursue an active and independent lifestyle. However, because the process to obtain it may be complicated, and often costly, people may be deterred (DeJonge & Rodger, 2006; Scherer, 2005b). In the event that someone needs an assistive device for the first time, or when old or worn-out equipment needs to be replaced, the process of contacting a source for funding and then waiting for approval or disapproval can be taxing, requiring a lot of time and energy (Scherer, 2005b). As a result of this difficult process, people may not use AT often, if at all.

Service providers believed their role was to provide support for consumers on AT. Many wanted to learn more about AT, but they found it difficult because they were unfamiliar with, and lacked resources in, AT related issues, trends, requirements, and advancements. Even if job seekers with disabilities are able to find a centre equipped with AT to help them search for employment, they may still be limited in that the staff may not be knowledgeable on how to use the equipment or software and therefore cannot provide guidance to the job seeker (Timmons et al, 2007). So, if the service providers do not have adequate training and information, they are unable to properly assist consumers. The introduction of a more coordinated system for provision of AT-related information

would then help increase the participation rates of people with disabilities who are looking for jobs. More respondents who reported unmet needs also had a favorable attitude toward AT, saying they believed AT was a good thing for their everyday lives. This may mean that people who have unmet needs are aware of the potential AT has for helping them with areas of difficulty in their lives.

Another significant finding was that health status and unmet needs were not independent of each other, as those with met AT needs tended to report better overall health. Also, more people who reported being satisfied with their involvement in the selection process for their AT, expressed good or excellent self-reported health. When people are proactively involved in purchasing decisions for AT and feel they have acquired AT that will meet their needs, they are more likely to have a positive view of their overall health. This self-reported positive health could be linked to perceived sense of control in their own lives (Peterson & Murray, 2006).

Matching person and technology.

My study confirms previous studies that found that the high cost of many technologies and the lack of follow-up support are obstacles to securing a good fit between the person and the technology used by the person. Scherer (2005b), for example, supports the use of the MPT Model. Using this model, the potential consumer's perspective is the primary focus when choosing what AT to use. Service providers indicated that they would like to better assist a person with using AT that was a good fit for their individual needs. Therefore, Scherer's MPT model should be used by service providers in helping to set up consumers with AT. The MPT model consists of checklists to record the unique goals

and preferences of each consumer, views of the benefits that may come from using a technology, and changes in how each individual perceives their outcome achievement over time (Scherer, 2005b).

Recommendations:

- 1) That the ILRC, CNIB, CHAA-NL and CNA partner with the Department of HRLE and/or the Department of Education to coordinate and deliver workshops and training sessions in post secondary schools, hospitals, group homes, with follow-up visits as needed to help consumers refine and tune a device for their specific needs.
- 2) That individualized assessment be conducted by rehabilitation professionals, and community organizations offering AT services, to ensure a good match between the person and the AT and that the needs of each consumer are met.
- 3) That consumers have a chance to use the devices on a trial basis first, before any decisions are made to select AT they may be interested in or that may have been recommended to them.
- 4) Any coordinated system for AT information for consumers would need to incorporate a process for involving consumers in the selection of the AT they will use. It is best practice to partner with the user when selecting the most appropriate AT (Timmons et al., 2007).

Barriers to Acquiring AT

Cost was cited by the majority of survey respondents as being the biggest barrier to obtaining AT. This was followed closely by a lack of funding, lack of technical support, lack of AT info, and lack of training. These results are supported by Statistics Canada

(2006), HRSDC (2003), Hoppstad, (2007), and McCreadie et al. (2006). Hasselbring and Glaser (2000) identified that although "technology has the potential to act as an equalizer by freeing many students from their disabilities, the barriers of inadequate training and cost must first be overcome before wide-spread use can become reality" (p. 103).

Access barriers to AT information and services also included: inadequate transport, spatial distribution of AT service centres, mobility limitations, access to computer use and lack of computer skills, especially with the aging population, and a lack of demonstration centres.

Adequate transportation to resource centres offering AT enables people to access AT information, equipment, software, and services. For someone living in rural and remote parts of the province, such as Fogo Island, it is more difficult to access AT resources. Added to this difficulty of accessing AT is learning how to use it. Limited or no computer skills is often a barrier to benefiting from AT for education or work purposes. These barriers to using, or learning to use, AT can negatively influence the health and well being of an individual, their employability, educational opportunities, etc.

Limited access to employment opportunities brings up the issue of poverty for people with disabilities. Poverty continues to disadvantage people with disabilities. Poverty presents obstacles to purchasing AT. People living in poverty spend much of their time, energy and resources just trying to survive. People who need the most support are less likely to access employment services because the system is geared toward independent and educated job seekers (Timmons et al., 2007). Also, limited access to printed material is a major barrier for people with visual impairments and blindness who attempt to secure

employment (Strobel et al., 2006). Job seekers with disabilities who use AT may be better able to compete in the job market, due to the independence that AT can provide to navigate the employment system.

Consumers who report not using AT also cited barriers, with more than half of them citing high cost, lack of skilled professionals, and lack of awareness about the availability of AT. They may not have used AT because it was too expensive to buy, and there was no one to help them make appropriate decisions on what was available. Respondents did express that not having a knowledgeable person to consult with on AT was a problem when making purchasing decisions. The literature states that older members of society are the best judge of their own needs, but they need to be given sufficient information so that they can make choices for themselves (McCreadie et al., 2006).

This is where the role of the service providers comes in. It is their job to provide this information for consumers so that they can make informed decisions regarding AT. However, the service providers said that they know the problems and the solutions that are needed, but they lack knowledge about specific AT products or which products are best suited for use by people with specific disabilities. These barriers need to be addressed immediately within the province of Newfoundland and Labrador so that all residents have the same access to opportunities in their communities as people without disabilities. People with disabilities are not a homogeneous group. Depending on rural/urban location, type of disability, income, etc, some are more disadvantaged than others. So this really supports a comprehensive and improved system.

Awareness of AT

Consumers and service providers wanted more access to information on available AT for purchase and/or use. Both groups believed that employers especially need to be made much more aware of what is out there and why they should consider investing in such technology for their employees and what benefits they will gain from making such investments. This will help support the inclusion of people with disabilities in the workforce. "Low tech" (e.g. adapted furniture, large print, magnifiers, etc) and "medium tech" (e.g. adequate lighting, adapted keyboards, visual alarm system, etc) solutions are relatively less costly to purchase and maintain. If employers were made aware of some these inexpensive options, a new world of employment opportunities would be introduced to people with disabilities.

Respondents indicated that user guides and information on AT software and hardware were often very technical and difficult for a novice to understand. Some respondents have educational experience and/or friends in the IT field to help them. My findings are consistent with previous studies that reported that best practice methods involve improving access to information and presenting that information in ways that are accessible and understood, especially by older people. Pamphlets have been shown to be especially effective for distributing AT information and supporting personal contact (McCreadie et al., 2006).

It can be very confusing for consumers who are trying to figure out what program or agency may cover the cost of AT. It would be very beneficial to provide information in a user friendly format, detailing where to go and how to access funding for AT relating to

education or employment. Recycling programs, lending programs, and demonstration centres are ways for individuals to access AT at a lower cost and to test for a match. The most cited reason why respondents did not use recycling programs, lending programs, and demonstration centres in NL was due to a "lack of awareness" that any such programs existed. This finding is important because there actually are programs that exist across the province and offer some level of recycling, lending and demonstration of AT. The fact that so many consumers are unaware of their existence is serious because it means consumers may not be using them and service providers may not be recommending them. This lack of awareness is a significant issue that can easily be addressed. The use of a toll-free hotline for AT support is one way. A large majority of respondents said they would likely use a toll-free hotline for AT support if one were made readily available. A hotline for AT information is an example of an SEP system.

Recommendations:

1. That the Government of Newfoundland and Labrador help fund a comprehensive AT centre or hotline in the province, with experts from each association (i.e., CNIB, CHHA, ILRC) handling the area of AT that they are familiar with (i.e., the CHHA component would have assistive listening devices (ALDs), CNIB would have visual aids). This AT centre would be modeled after MRCs AT program, the ILRC's AT program and CHHA's ALD program, which were highly praised by consumers for their access to information and advice on devices, and provision of both technical and moral support.

2. That more awareness be provided on the existing funding programs for adults and students in alternate formats, especially electronically, as this is a most convenient form of communication. That promotional materials for AT be developed using plain language and alternate formats, such as large print (14pt or larger), Braille, or electronic text, PDF to be accessible to people with disabilities. Use of a sans serif font, such as Arial or Verdana and text printed with the highest possible contrast (black text on a white background) is best (McCreadie et al., 2006). These improved and accessible sources of information should be distributed by postsecondary institutions, community organizations and the Government of NL.
3. That the Department of Health and Community Services and Department of Education link with the local colleges/universities to put new users in touch with peers who use similar technology. This could be done via a social network site or online forum whereby people can share their experiences about getting/using AT. Recently, the Department of HRLE launched a new Youth Retention and Attraction Strategy for the province complete with a website and Facebook link to encourage youth to chat with each other. A similar website for adults seeking information on AT would be beneficial for distribution of consumer input and advice. Such an electronic system would be similar to tele-health and could be explored as a way to increase access to support and allow professionals and users of AT to benefit from the experiences of others (Parette, 1997; PHAC, 2002). Having access to others who use AT on a daily basis would reduce isolation, facilitate more efficient use of the technology by sharing skills and troubleshooting techniques (Beliveau, Cook, & Adams, 2006).

Assessing the Needs of Individuals

Study participants suggest that adequate and timely assessments is crucial in obtaining and gaining maximum benefit from AT. Consumers and service providers both spoke about the lack of qualified professionals available to provide appropriate assessments for people when they are considering purchasing AT. This finding mirrors that of Timmons et al., (2007) and Scherer (2005b), who found that an accurate assessment of needs is critical to the delivery of effective AT support. The benefits of a needs assessment include providing an understanding of AT utilization, assisting with choosing the most appropriate devices, and adjust purchasing strategies.

The effectiveness of AT is gained only if one is able to acquire it but the process to obtain AT can be costly to individuals with disabilities. Financial support is needed for individuals to pay for the AT and any training costs associated with it. Consumers and service providers alike stated that the provincial government has a responsibility to play a role in helping to increase access for people to obtain AT and to access information and training services related to AT. Subsidized programs like those that exist in other Canadian provinces, were recommended to help cover the cost of AT and reduce a significant barrier for people whose lives could be enhanced with the use of AT. For example, there needs to be an easier way to qualify for funding to get something like a psycho-educational assessment for someone with a learning disability (LD). Written documentation stating that a person has an LD is often an eligibility requirement to qualify for Canada Study Grant funding for accommodations, such as AT, in post-secondary institutions. However, this documentation can cost upwards of \$3000 and is

often beyond the financial abilities of most students and adults in NL who may wish to further their educational and employment opportunities.

Recommendations:

1. That an umbrella group modeled after the United Way be generated by community organizations to generate funds that would be matched by government departments, such as the Department of Health and Community Services and the Department of HRLE, to help cover the cost of individualized assessment, such as the psycho-educational assessment.
2. That Health Canada and the NL RHAs support a 4-week, interactive mediated (e.g. discussion boards, web lectures, and video) course for rehabilitation counselors to equip them with knowledge and skills to support consumers in choosing, acquiring, and using AT. This recommendation is based on a Masters of Science in Rehabilitation Counseling program through distance learning technology currently offered throughout the U.S. and Canada (Scherer et al., 2005). Since there is no Masters training in NL, the recommended training can be part of a professional development seminar series.
3. That assessments and training be done where consumers will actually be using the devices.

Payment for AT

Consumers reported paying for most or all of their AT, using a variety of sources, mainly their own income. Given that the modal household income for survey respondents was \$10,001- \$30,000, it is worrying to see that consumers tended to pay for AT themselves

rather than benefitting from government funding. More of this self-paying group reported having unmet needs than those who had AT owned or provided by someone else (e.g. employer). It may be possible that more training or support is available to those who use AT provided by another person or organization (e.g. ILRC, CHAA-NL) than if they purchase it on their own.

The finding that consumers paid for most or all of their AT is consistent with national and international surveys that indicate that most adults with disabilities pay for their AT devices themselves (PALS, 2006). Funding for AT devices and services (professional assessment, training and follow-up) is varied throughout the province. The same situation exists throughout Canada (Bartram & Jeffrey, 2004; Ripat & Booth, 2005). Only five provinces (Alberta, Saskatchewan, Ontario, Quebec and Prince Edward Island) provide comprehensive funding for a wide range of people with disabilities and for a variety of products. My findings show that a lack of government funding has been cited as a barrier to the acquisition of assistive devices province-wide, just as others have found the same situation on a national level (Bartram & Jeffrey, 2004; Scherer, 2005b).

The low availability of funding for AT has been attributed to the fact that low budgets of funding sources for AT mean agencies have to try and maximize benefit to consumers at minimum cost: Responses to funding requests have gotten slower, the application process is becoming more complex, and the eligibility criteria to receive funding is more difficult to meet (Scherer, 2005b). People with disabilities who manage their money well, and have the support of family, friends and government, etc, are able to get by, but for those who do not, they can become "stuck" (Scherer, 2005b).

Results from my study found that of those who reported having unmet needs, more people reported an income level of \$30,001-\$50,000 than those with income levels between \$10,001-\$30,000 and less than \$10,000. This demonstrates that having more available income does not necessarily mean an individual has the resources they need to truly benefit from AT. It could be that they are able to afford the required AT, but do not have adequate training and resources to feel their needs are met. They may not know where to go to get further information about their AT. Or, they may have obtained AT that is not a good contextual fit for them, and so it may fail to meet their individual needs or preferences, preventing maximal benefit from being achieved.

Recommendations:

1. That the Departments of Health and Community Services, Education and HRLE partner to introduce a cost-sharing program similar to other provinces that would subsidize AT supports that help to improve education, work opportunities, day-to-day living and quality of life for people with disabilities.
2. Funding from HRLE be reviewed and allocated to various organizations that are in need of improving their AT services for consumers with disabilities in NL and establish local resource centres.

Satisfaction of Consumers and Service Providers

Study participants indicated that satisfaction with the service aspects for AT was generally low throughout the province. This is similar to other research which found that the main reason for dissatisfaction and abandonment of AT is due to the service delivery system and not the characteristics of the AT itself. Escalating needs and long wait times

can lead to frustration of both the users and any support teams in place to deliver AT services and supports. This frustration and dissatisfaction can lead to AT abandonment. Therefore, “[i]t is in the interest of any service delivery system to achieve the lowest possible rates of abandonment in order to avoid wasting resources” (Andrich & Caracciolo, 2007).

Consumers and service providers highlighted that having access to an AT “expert” is critical to a successful outcome with AT. Similarly, Sund (2008) and DeJonge and Rodger (2006) also reported that having access to the right people is very significant in the satisfaction of individuals toward using AT. To be truly effective, service providers need to be knowledgeable on many forms of AT “with an understanding of a wide variety of disabilities and their impact on the physical and psycho-social functioning of the individual” (Szlamkowicz, 2007, p. 169).

More respondents from St. John’s and vicinity (surrounding area) reported higher satisfaction levels than those from areas outside of St. John’s and vicinity. This could be because most of the disability resources and services for the province are located in and around St. John’s. Professionals with expertise in the area of AT are few and far between in NL, as nationally and internationally “[AT] is a new field and one in which credentialing of practitioners is recent” (Scherer, 2005b, p.177). This is changing, but there is still a long way to go in addressing continuing professional development in AT as well as the education and training of new practitioners in the field of disability.

Recommendations:

1. That the NL Medical Association, Association of Registered Nurses of NL, NL Association of Social Workers, and Pharmacists Association of NL take responsibility for ensuring that continuing education on disability issues focus on the role of disability supports, accommodations needed in the medical system (i.e. universal design), and barriers that are present in the medical system (CCD, 2002). This would be a part of the mandatory curriculum for health professionals, as these professionals are the gatekeepers in the lives of people with disabilities. It would also emphasize the issue of why disability supports are so critical to independent living, and at the same time provide paid employment to people with disabilities who deliver the training. Also, it will provide a sense of empowerment to those who have traditionally felt they were not being heard by the health care system.
2. Funding be secured from the Department of HRLE and the Department of Education to improve existing services, such as the ILRC's Internship Program. This would enable designation of full-time AT experts to support individuals with disabilities in a number of locations throughout the province and Labrador through the use of technology and virtual offices. It would also provide trained personnel to do home visits when a problem arises with an individual's AT.

Variability in Assessment and Training

In NL, there is no specific agency or subsidized programs for AT, there are no transitional services available as individuals move from the K-12 school system to post secondary institutions and/or the workforce, and not all existing AT services have

equipment readily available for loan or trial. The professional assessment and training services to facilitate informed and accurate decisions on the part of the consumer about the technology are limited. In general, it was found that technical support and training for AT varied a great deal in NL, even at exemplary sites.

I was surprised by how many respondents spoke about the need for a more coordinated system for people to access AT and AT resources, and provided descriptions of how such a system should operate. The majority of respondents felt that it is essential to develop an AT training site/resource centre to enable both consumers and services providers access to information and training materials, as needed. This would increase the effectiveness of the AT that already exists in organizations, agencies and personal homes. Although obtaining AT was identified as being very important to consumers and service providers, being able to properly and effectively use the acquired AT was collectively deemed by the respondents to be of utmost important in enhancing the life of the consumer to the fullest extent. The literature supports this finding in that training has been identified as being very important to adopting and using AT (Butterfield & Ramseur (2004). I was not surprised to find that the majority of my respondents learned to use AT on their own. They described this self-taught learning as a frustrating experience that required trial and error. Similar to DeJonge and Rodger (2006), my study found that this independent process was a very time-consuming approach which required respondents to be very resourceful in accessing the needed information.

Significant gaps in AT service delivery in the province are evident. Less than half of survey respondents and a minority of the interviewees in my study were aware that a

cross disability organization offering AT services exists in NL. Consumers and interviewees asserted that there is a need for a comprehensive AT delivery service in which all residents of this province can access.

Recommendation: Organizations with resource rooms (rooms generally equipped with all the technology needed to conduct an independent job search (computers, fax machines, photocopiers, etc) should require their staff to dedicate 20% of their time in the resource room to assist customers and practice using the AT. Staff should be required to demonstrate time spent with different pieces of technology as part of their performance review. Regular opportunities for practice achieves more success than just formal training sessions (Timmons et al., 2007).

SEP System

The need for a “one-stop” or “single-entry point (SEP)” system was proposed by service providers and consumers throughout the province as a solution to the segmented system that currently exists. There are many reasons why an SEP would improve access to disability services for both consumers and service providers in NL. Given the aging population of NL, an SEP would provide long-term services in the least restricting and most cost effective way (Governor’s Council on Disability, 2006). It is estimated that 20% of the people of NL will be over age 65 by 2017 and more than 45% will be over age 50. In 2007, those over 75 made up 6% of the population. This is likely to increase to 7.5% within 10 years and 12% within 20 years (Gov. of NL, 2007, p. 6). As such, the demand for AT will rise.

An SEP will address the variability in AT devices, AT services (e.g., professional assessment, training and follow-up), referral and application processes for AT, and service provider's knowledge of current applications of AT that are available for individuals with a range of disabilities. Many reasons have been cited for this variability, including funding, time, commitment, training and leadership direction (Ripat & Booth, 2005). Findings from this study also show that high turnover among staff as well as limited practice using the equipment account for some of the variability in services. This indicates the importance of permanence in service provision, and fits with the idea of one-stop-shopping for all as a more consistent, centralized, continuous way of providing essential services to consumers.

Participants asserted that a one-stop, or SEP system, would be most successful if set up as a self-service environment with staff trained in using the available equipment or software, so as to provide better guidance to job seekers with disabilities. These findings are supported by the literature which emphasizes the need for knowledgeable staff to increase utilization of a one-stop system (Fesko et al., as cited in Timmons et al., 2007).

Individualized training (a component of an SEP) was identified as an especially important aspect for AT users in my study. Many students in post secondary institutions have expressed to service providers that they would prefer a setting to try out devices rather than take part in group training. There is a growing awareness that AT is an important field for the future, but there remains a "...need to inform a wide range of the public about the availability and benefits of [AT] in ways that can reach them easily and

in an understandable and personalized way” (Scherer, 2005b, p.178). This is one way to ensure that services for people with disabilities are improved.

Instead, both consumers and service providers said that the Government of Newfoundland and Labrador must do more to put it on par with other provincial governments that provide individual AT services and devices to enable equal opportunities for participation of all their residents. Having an AT demonstration centre was generally regarded as being the most important service for respondents, followed by an AT device loan program and a AT reutilization program. This ranking was supported by consumers indication that they would recommend a demonstration centre to their friends. These numbers, and the order of which the programs were ranked, parallels research conducted by the Massachusetts Rehabilitation Commission’s (MRC) AT Program in the U.S. Therefore, it would be wise to allocate AT program resources for NL based on these preferential responses.

Before designing any program change, it is important for organizations to look at the various disability models. How disability is defined and perceived impacts on the provision of AT programs, policy decisions and priority setting of funding agencies, governments, and other critical decision-makers (Hersh & Johnson, 2008).

Recommendations:

1. That an SEP system be funded by the Government of Newfoundland and Labrador, and modeled after AT-BC. A one-stop centre for AT could fall under the auspices of an institution, either a university or college and have a significant impact on improving the availability of technology solutions in the province, improving service

delivery and facilitating integration of persons with disabilities into all areas of community life (Szlankowicz, 2007). Formal and informal linkages with disability-specific community-based organizations with expertise in AT will need to be considered in the development of any SEP/one-stop system.

2. To enable program development and implementation of a system whereby people can obtain services and supports at a single entry point, funding from HRLE be secured until December 2020.
3. That the disability community (e.g. advocacy groups and consumer organizations) work in conjunction with the Disability Policy Office to generate additional evidence required to inform Government department policies and promote inclusion by increasing access to AT for all people in this province.
4. The Disability Policy Office be responsible for monitoring policies and procedures to ensure consistency for people assessing AT supports and services. The Office would ensure a high level of service regarding implementation of any form of an SEP, regulating all aspects of the products and services provided by a group, such as the ILRC. The Disability Policy Office would oversee the operation of the ILRC, ensuring that funding is made available to them by the Provincial Government. Involvement from the Disability Policy Office and the ILRC would help inform any further design, development, and implementation of AT services. It would also ensure that the voices of consumers would be included.

Conclusion

AT has the potential to enhance people's lives. The results of this study indicated that cost was the main barrier to acquiring AT, and that when people do acquire AT, they usually pay for it themselves. Existing funding programs do not appear to be meeting the needs of all residents and the majority of recommendations from consumers advocated for a subsidized program for AT in NL. There is a significant need for increased awareness and training on AT, especially in the more rural regions of the province. An AT demo centre that serves as an SEP for information and resources on AT only, with a toll-free hotline and that extends to rural areas (via the web or travelling workshops) was the preferred direction for increasing AT services in the province by participants in my study. It is essential to have appropriate financial, human and environmental resources to integrate AT into the life of a person with a disability (Scherer, 2005b).

My findings suggest that improved knowledge about AT and increased training for service providers and consumers is greatly needed in this province. More specifically, the research findings described three strategies that would be beneficial in increasing access to support for job seekers with disabilities and for students in, or wishing to attend, post secondary. These are (1) promotion of AT awareness throughout the province, (2) an accurate assessment of AT needs, and (3) staff training and practice using the equipment.

The above recommendations are suggestions for improvement in an area of disability service that is critical at this point in time. AT is essential for people with disabilities to maximize productivity, and improve their employment, access to education, health, and social participation. As technology increases, so too does the potential for AT to enhance

the quality of life for more and more diverse groups of people living with disabilities in NL.

Limitations of the study

There are limitations in the research design that should be considered when applying the findings to inform future work on AT in this province. Firstly, interviews with service providers were conducted in a variety of settings which may have influenced the quality of data generated. Some interviews were conducted in coffee shops and others in private rooms at a university, workplaces, and over the telephone (landline). The coffee shop locations may have been advantageous because they were less formal environments, but they may have also reduced the level of information revealed by interviewees because of the presence of others in the area and a fear of being overheard. Although the two people I interviewed at a coffee shop were quite candid, I cannot rule out that there may have been discomfort with speaking freely about some issues in a public place (Elwood & Martin, 2000). Secondly, transcription of the interviews did not always take place immediately following the interviews, due to time constraints and competing responsibilities. Certain prompts and probes that were effective for one interview may have been forgotten for use in subsequent interviews because of the lag in time between data collection and transcription.

Lastly, my survey drew on a small sample size. By being unable to gain access to a specific population of post secondary students, a large population of AT consumers within various communities of the province were not surveyed. Without an adequate sample size, it is not possible to make generalizations to the greater population of NL.

The small sample size of the survey imposed limits on the types of analyses performed. For example, a chi square (X^2) statistic (used to investigate whether distributions of categorical variables differ from one another) is an ideal test to run on the current data. However, because more than 25% of the cells had low counts, the overall chi-square value is less likely to be valid (Brown & Stewart, 2002).

Recommendations for Future Research

Given the limitations/scope of my study and what my study found, recommendations for future research would include attention to the more rural areas of the province and what their experiences are in the area of AT service provision. Also, to look at what their needs and preferences are if AT services are to be expanded for the residents of this province who could benefit from using AT. Sampling a larger population of students and adults seeking employment would be a good area to concentrate on as well.

The use of the CAT model, detailed in Chapter 4, requires further research, particularly in the use of the model as an investigative and data gathering tool, the possible creation of a suitable AT database and an interactive software implementation for use by individuals, and social, caring and rehabilitation professionals. At the completion of this study, there are no published reports that reference the CAT model besides those of Johnson and Hersh, original authors of the model.

Another area that needs further research concerns the ability of organizations that are currently offering AT training services. How are self-designated "AT experts" that are currently employed in NL, going to remain current and deliver necessary and appropriate

training to consumers and disability service providers who request such services? Is there a need to have training provided by local and/or national vendor groups?

Dissemination

I will attempt to publish and present the achieved results in various publications in the field of disability and impairments, knowledge management, and scientific and industry communities. One potential publication is "Closing the Gap" (an AT magazine which explains how technology is being implemented in education, rehabilitation, and vocational settings around the world). This is what is referred to as a "non-index" source, which will reach more than just members of the scientific community.

I have partnered with other community organizations such as the ILRC, Ability Employment Corporation, Community Employment Corporations, and Literacy NL, as well as the Partners for Workplace Inclusion Program (PWIP), to gain an awareness of the issues surrounding dissemination of the research results, and to determine how to make the results available to students, clients and staff of these organizations. From communication with these organizations and my experience with populations of these areas, I have focused on the following methods of dissemination:

1. Written report to be submitted to the primary audience of public policy makers in provincial and municipal governments. I will first share my findings with the Disability Policy Office of the Provincial Government to gain support in disseminating findings to other government departments. As policy makers prefer to have "information that is concise, current, hits the main points, discusses the implications of research findings, and contains information that enables them to

follow up if interested,” (Feldman, Nadash, & Gursen, 2001, p. 314), I aim to submit my results to them in the 1-3-25 format as recommended by CHSRF (2001) to create ease of understanding and may lead to implementation of policy change by decision makers (Bero, Grilli, Grimshaw, Harvey, Oxman, & Thomson, 1998).

2. Interactive educational meetings with policy makers, health care providers, and fellow researchers as these interventions tend to promote behavioral change among health care professionals (Bero et al., 1998).
3. Presenting at additional conferences, like the Canadian Council on Rehabilitation and Work (CCRW) and the Canadian Association for Health Services and Policy Research conferences, to facilitate dissemination of my findings.
4. Profile the idea of an SEP for AT at a general level for press release for local media, as well as on the websites of various provincial government and disability organizations.
5. Delivering my information through existing networks, communication channels, association's/organizations, meetings, and other venues. The parent support group meetings held by LDANL and monthly meetings of Literacy NL are prime settings for the dissemination of my AT research.

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Appendix A: Disability-Related Community Organizations in NL with AT Services

Program/ Organization	Geographic area served	Type of service(s)	Eligibility requirements	Applications processing	Cost to the consumer?	Barriers to Service delivery	Source(s) of funding
College of the North Atlantic (CNA)	Provincial	-Adjustable workstations with AT hardware and software (e.g., Kurzweil 3000, Dragon Naturally Speaking and ZoomText) - Some AT training provided to students by Resource Facilitators (RFs)	Self disclosure of disability on CNA application. Supporting documentation required (e.g. a doctor's certificate, psycho-educational assessment, ISSP, and /or other academic records from High School.)	-Application to admissions office forwarded to Disability Services Coordinator. Students already registered with CNA but who did not self-identify are encouraged to contact the Coordinator of Disability Services to discuss any disability-related needs	No	-RFs have no formal AT training, Mostly self-taught knowledge in the field of AT	HRLE - annually
CNIB	Provincial	-Offer a range of AT equipment -Advisory service and training program for people with vision loss in NL. -Province-wide awareness	CNIB Services available to people who have difficulty with everyday activities due to vision loss.	Prospective clients complete a Request for Service form and wait time of 2-3 days. Form requires information on field of vision, referral from	No	-Limited number of staff -No formal AT training of staff.	United Way

Program/ Organization	Geographic area served	Type of service(s)	Eligibility requirements	Applications processing	Cost to the consumer?	Barriers to Service delivery	Source(s) of funding
		sessions on AT		Ophthalmologist, Optometrist, Doctor, Family, Friend, etc and a referral section completed by Family Doctor and/or Eye Care Specialist.			
Canadian Hard of Hearing Association - Newfoundland and Labrador (CHHA-NL)	Provincial	-Technical Devices Loan Program for a 2 week period. A wide variety of AT ranging from amplified microphone devices to signaling devices. Allows recipients to test different devices. -Extensive library of information and other resources	Programs and services available to everyone who is hard of hearing or late deafened and their families	A loan form must be completed with a valid drivers license (or another photo ID) with their existing address. If the devices they wish to loan equal more then \$1000, then they must also provide a valid credit card or place a 25% refundable deposit	No – all programs and services are free of charge	Keeping current with changing technology	99% of their operating budget is fundraised through a Dream Home Draw
Learning Disabilities Association of	Regional (St.John's)	- Computer workstations available with	Be a registered member of LDANL	N/A	\$30 membership fee for	AT hardware/ Software in place, but no	HRSDC, United Way

Program/ Organization	Geographic area served	Type of service(s)	Eligibility requirements	Applications processing	Cost to the consumer?	Barriers to Service delivery	Source(s) of funding
Newfoundland (LDANL)		AT hardware and software (e.g., Kurzweil 3000, Dragon Naturally Speaking and Word Q/SpeakQ -Province-wide awareness sessions on AT			individuals and \$100 for organizations	staff trained in the AT	
Newfoundland Coordinating Council on Deafness (NCCD)	Provincial, but due to limited funding, it is becoming restricted to being regional.	-Vocational counseling -Consult with students on purchasing technology (e.g. cell phones, hearing aids) - Train university professors to use the technology. -ALDs loaned to students on a year-to-year basis - Cost shared tutoring - NCCD provides up to	-Referral from an audiologist (requires a copy of audiogram -Be a registered postsecondary student	No formal application process. - Student signs a contract stating that a fine of \$3500 is to be paid if the equipment gets damaged. Name, address and SIN number is also required.	No	Limited staff (only one full time and one part time, working 3-4 hours a week) and a <i>very</i> limited annual budget.	Annual grant provided through Provincial Government (HRLE).

Program/ Organization	Geographic area served	Type of service(s)	Eligibility requirements	Applications processing	Cost to the consumer?	Barriers to Service delivery	Source(s) of funding
		\$10 /hr and the rest is supplied by the individual's financial assistance from HRLE .					
Independent Living Resource Centre (ILRC)	Provincial	Adaptive Technology (AT) service - Training workshops - Informal AT training	No referral or application process. ILRC welcomes anyone with any type of disability	AT consultant meets with and discusses AT options with interested consumers	No	- AT coordinator -No formal training	Funded by HRLE

Program/ Organization	Geographic area served	Type of service(s)	Eligibility requirements	Applications processing	Cost to the consumer?	Barriers to Service delivery	Source(s) of funding
Red Cross - Health Equipment Loan Program	Provincial (25 Red Cross Branches throughout the province)	Short-term (3 month) loans of wheelchairs, walkers, crutches and bathroom aids to help those recovering from illnesses, injuries, surgeries or with disabilities	Approval and recommendation by Occupational Therapist (OT) or medical doctor.	-Form is filled out by an OT or doctor -The OT or doctor can call/fax local Red Cross office which negates the requirement of the form.	No	-Little equipment available -First come first serve -high demand -2 wheel versions of walkers are scarce	Donations, corporate partnerships as well as government funding for specific programs

Appendix B: Financial Assistance for AT for People with Disabilities, NL

Name of program	Federal/ Provincial	Eligibility criteria	Program mandate	Barrier to service delivery	Program funding	Information Source
Canada Pension Plan (CPP)	Federal	-Under 65 years of age -Must have stopped working because of a medical condition -Must have made valid CPP contributions in at least 4 of the last 6 years, or have made CPP contributions for at least 25 years, including 3 of the last 6 years, prior to medical condition.	Provide a monthly taxable benefit to contributors who have disabilities and to their dependent children.	Substantial use of the medical model for determining client's eligibility.	Service Canada	http://www.hrsdc.gc.ca/eng/isp/pub/factsheets/retire.shtml
Opportunities Fund	Federal program	-Self-identify as having a permanent physical or mental disability ⁱ ; -Be unemployed or working less than of 20 hours a week; -Be legally entitled to work in Canada; and - Be in need of assistance to prepare to enter the job market, to find a job, to get a job, or become self-employed. -Individuals must not have received Employment Insurance benefits within 36 months of their request.	Supports a variety of activities, in partnership with organizations including with the private sector, to help people with disabilities overcome the barriers they may face as they enter the job market.	The budget for this program usually gets exhausted halfway through their fiscal year.	Service Canada	http://www.hrsdc.gc.ca/eng/disability_issues/funding_programs/opportunities_fund/index.shtml
Grant for Students with Permanent Disabilities	Federal	1) Apply and qualify for a Canada Student Loan 2) Be enrolled in a full-time	To assist in covering the costs of accommodation,	Student must have a permanent disability.	Human Resources and Skills	http://www.hrsdc.gc.ca/eng/learning/canada_student

		<p>or part-time postsecondary program (minimum 32wks)</p> <p>3) Meet the criteria for students with permanent disabilities</p> <p>4) Provide acceptable documentation (medical certificate, psycho-educational assessment, proof of receipt of federal and/or provincial disability insurance).</p>	tuition, books, and other education-related expenses up to \$2,000 per loan year.	<p>Verification of a disability may require a costly assessment. E.g. The cost of a psycho-educational assessment for a learning disability averages \$2000, to be paid by the student.</p>	Development Canada (HRSDC)	_loan/grant2.shtml
Grant for Services and Equipment for Students with permanent Disabilities	Federal	<p>Same criteria Grant above, with added points:</p> <p>5) Provide written confirmation of need of exceptional education-related services or equipment from a person qualified to determine such need</p> <p>6) Show in writing the cost of equipment and services.</p>	Provide up to \$8,000 per year to help students with disabilities pay for exceptional education-related costs (e.g. tutors, oral or sign interpreters, attendant care for studies, specialized transportation (to and from school only), note takers, readers, brailers.	Same barriers as the previous Grant.	HRSDC	http://www.hrsdc.gc.ca/eng/learning/canada_student_loan/grant2.shtml
Employability Assistance for Persons with Disabilities	Provincial	<ul style="list-style-type: none"> - individuals with a developmental disability - community groups (usually employment corporations) 	Delivers services in employment counseling and assessment, employment planning, pre-employment training, post-	High demand and limited funding/available resources	Funded under the Labour Market Agreement for Person	http://www.hrle.gov.nl.ca/hrle/disabilities/services.html

			secondary education, skills training, technical aids and other supports to assist individuals obtain access to job opportunities and training.		with Disabilities (LMAPD) and cost-shared with HRSDC	
LMAPD	Provincial	<ul style="list-style-type: none"> -be non EI eligible -have completed highschool or be in their last semester of high school -participate in an Enhanced Screening Assessment (ESA) and be referred to a Career Development Specialist for determination of eligibility for Employability Assistance for Persons with Disabilities (EAPD) and the development of an employment plan (critical piece) Be enrolled as a full-time student in the first year of a postsecondary degree/program 	Designed to assist persons with disabilities successfully prepare for, enter or remain in the workforce. Funding is available to assist eligible individuals to acquire needed disability related supports and services (including EAPD).	Students need to self-identify a disability and provide sufficient medical, psychological or other documentation that demonstrates significant challenges and verification of disability. If documentation is insufficient, the student has to arrange another assessment within 30 days of their ESA to be paid by the student.	HRLE and cost shared with Human Resources and Social Development Canada.	http://www.bsc-sec.ca/servlet/ContentServer?cid=1084465184821&pagename=CBSC_NL%2Fdisplay&lang=en&c=Services

Supports to Employment for Persons with Disabilities	Provincial	<ul style="list-style-type: none"> - Individual is not required to be on income support - Proof of any type of disability is required. 	<p>-Includes work place accommodations, work place adaptation, assistive devices (e.g. hearing aids, visual scanners, readers, technical equipment, computer-related AT to assist persons with disabilities to aid in getting and maintaining employment.</p> <p>-Provides up to \$5, 000 for AT.</p>	- General perception that it exists solely for people on income support	HRLE – Poverty reduction Strategy	http://www.hrle.gov.nl.ca/hrle/disabilities/poverty.html
Income Support Benefits – Vision Care Program	Provincial	<ul style="list-style-type: none"> • Be 18 years of age; • Be a resident of Newfoundland and Labrador; • Submit an application for benefits; • Be determined eligible according to a financial assessment. 	<p>Provide benefits including basic and non-basic financial supports (e.g. eye exams, and prescription glasses). Technical assistance devices for individuals who can verify that they are Deaf or hard of hearing, are sometimes covered (e.g. visual smoke detector up to \$250.00, Alertmaster telephone/doorbell up to \$155.00 and a TTY device up to \$422.00)</p>	-Client is responsible for costs associated with technical assistance devices.	HRLE	http://www.hrle.gov.nl.ca/hrle/income-support/healthservices.html#vision

Special Assistance Program (SAP)	Provincial	<ul style="list-style-type: none"> • Must reside in the community, which includes the family home, apartment, personal care home, alternate family care home, or group home. • Medical condition must be considered chronic versus acute. • Must first access other options to obtain the health/medical supply (i.e. private insurance, Veterans Affairs, etc.) • Must have a long term (greater than three months) or palliative need for the product; • Must have a professional assessment and where necessary a prescription completed; • Must meet financial assessment criteria (inclusive of liquid asset levels); and • Must hold a valid MCP card. 	<p>Examples of items included in SAP:</p> <ul style="list-style-type: none"> • Health/medical supplies (e.g. incontinent supplies, catheter supplies, gloves, ostomy supplies, humidifiers etc.) • Oxygen supplies (e.g. oxygen, oxygen equipment and accessories) • Medical equipment (e.g. wheelchairs, walkers and commodes) • Orthotics (e.g. braces, artificial eyes) 	For individuals not in receipt of Income Support who request SAP assistance, requests are dealt with directly by the RHA using the same financial assessment as for home support. The liquid asset exemptions apply. Client contributions may be required for items, based on the results of the financial assessment.	Department of Health and Community Services	www.easternhealth.ca/Tenders.aspx?d=1&id=280&p=277 [Tender ID: 2009-2691]
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ⁱ Permanent disability defined by: A functional limitation caused by a physical or mental impairment that *restricts* the ability of a person to perform the daily activities necessary to participate in studies at a post-secondary school level or the labour force and is expected to remain with the person for the person's expected life.

Appendix C
Assistive Technology Survey for Newfoundland and Labrador

Assistive technology (AT) is anything that is bought or made that increases, maintains, or improves the abilities of people with disabilities, to help perform daily activities. Some examples are listed in this table ----->

To complete this survey, you MUST be between the ages of 19 and 65 and have a disability OR be completing the survey on behalf of an individual who uses AT.

What is AT?

- wheelchairs
- walkers
- hearing aids
- assistive listening devices
- talking watches
- electronic aids to daily living
- large print material
- text-to-speech screen readers
- alternative keyboards and mice
- head pointing devices
- voice recognition software
- screen magnification software
- adaptive toys
- adaptive learning tools
- AND MUCH MORE

Section One:

1. Do you have difficulty with any of the following?

- | | | |
|--|-----------------------------------|--------------------------------------|
| <input type="checkbox"/> Seeing | <input type="checkbox"/> Learning | <input type="checkbox"/> Remembering |
| <input type="checkbox"/> Lifting | <input type="checkbox"/> Speaking | <input type="checkbox"/> Walking |
| <input type="checkbox"/> Interacting with others | <input type="checkbox"/> Thinking | <input type="checkbox"/> Hearing |
| <input type="checkbox"/> Listening (auditory processing) | | |

2. What disability would you say you have? (indicate all that apply)

- | | | |
|--|--|---|
| <input type="checkbox"/> Physical disability | <input type="checkbox"/> Visual disability | <input type="checkbox"/> Learning disability/ADD/ADHD |
| <input type="checkbox"/> Hearing disability | <input type="checkbox"/> Mobility | <input type="checkbox"/> Speech or Language |
| <input type="checkbox"/> Would rather not identify my disability | | |
| <input type="checkbox"/> Other (please specify) _____ | | |

3. Are you working for pay / self-employed:

☐ Yes

☐ No

If yes, do you :

- | | |
|--|--|
| <input type="checkbox"/> Work Full Time (30 hours or more) | <input type="checkbox"/> Work Part Time (less than 30 hours) |
|--|--|

If no, are you:

- | | |
|--|---|
| <input type="checkbox"/> Able to work, but currently not working | <input type="checkbox"/> Unable to work because of disability |
| <input type="checkbox"/> Unable to work for some other reason | <input type="checkbox"/> Retired |

If able to work are you:

- | | |
|---|--|
| <input type="checkbox"/> Looking for work | <input type="checkbox"/> Employed seasonally |
| <input type="checkbox"/> Not interested in working at the moment (homemaker, retired, in school/training) | |

4. Do you do volunteer work?

☐ Yes

☐ No

5. Are you currently enrolled in college or university?

☐ Yes

☐ No

6. What is your current living situation?

- ☐ Living alone
- ☐ Living with a partner/spouse or other family member(s)
- ☐ Living with roommates
- ☐ Living in a group home
- ☐ Living in a nursing facility
- ☐ Living in an institution
- ☐ Other: _____

Section Two:

Please answer these questions if you are an AT User or are completing the survey on behalf of an individual who is currently using AT. If not, please go to question 12.

7. Below is a list of AT products. Check any that you currently have and indicate how often you use each of them:

- ☐ **Communication Devices** - devices for persons who cannot speak (e.g. synthesized speech devices, picture communication boards)
 - ☐ Never
 - ☐ Rarely
 - ☐ Often
 - ☐ Always
- ☐ **Computer Access Aids** – software and hardware to enable computer use, (e.g. expanded keyboards, mini-keyboards, touch screens, and voice input/output software)
 - ☐ Never
 - ☐ Rarely
 - ☐ Often
 - ☐ Always
- ☐ **Sensory Aids** (non-computer based devices, such as hearing aids, assistive listening devices, tactile aids for the deaf/blind, alerting devices, Braille note takers)
 - ☐ Never
 - ☐ Rarely
 - ☐ Often
 - ☐ Always
- ☐ **Environmental Controls** (e.g., remotely controlled door openers, lights, radio/televisions)
 - ☐ Never
 - ☐ Rarely
 - ☐ Often
 - ☐ Always
- ☐ **Mobility and Seating** – devices to help persons needing mobility assistance (e.g., walking/standing aids, wheelchairs, seating systems, other types of wheeled mobility)
 - ☐ Never
 - ☐ Rarely
 - ☐ Often
 - ☐ Always
- ☐ **Orthotics/Prosthetics** (e.g., spinal orthotic systems, upper/lower limb orthotic systems, upper limb prostheses, upper/lower limb prosthetic systems, non- limb prostheses)
 - ☐ Never
 - ☐ Rarely
 - ☐ Often
 - ☐ Always
- ☐ **Modified Furniture/Furnishings** (e.g., modified desks, ramps, tables, light fixtures, sitting furniture, beds and bedding, adjustable height furniture, work furniture)
 - ☐ Never
 - ☐ Rarely
 - ☐ Often
 - ☐ Always

☐ **Other** (Please Specify): _____

8. What is the most recent assistive technology (AT) you obtained (you can use the categories and examples given in question 7)? _____

For this piece of AT, please rate your level of satisfaction in each of the following areas, using a scale of 1 to 5, where 1 is "Not satisfied at all" and 5 is "Very satisfied":

If an item does not apply to you, respond with N/A (not applicable).

	Not satisfied at all	Not very satisfied	More or less satisfied	Quite satisfied	Very satisfied	Not Applicable
ASSISTIVE DEVICE						
<i>How satisfied are you with:</i>						
the dimensions (size, height, length, width) of your AT?	1	2	3	4	5	N/A
the weight of your AT?	1	2	3	4	5	N/A
the ease in adjusting (fixing, fastening) the parts of your AT?	1	2	3	4	5	N/A
how safe and secure your AT is?	1	2	3	4	5	N/A
the ease in using your AT?	1	2	3	4	5	N/A
the comfort in using your AT?	1	2	3	4	5	N/A
the effectiveness (usefulness) of your AT?	1	2	3	4	5	N/A
SERVICES						
<i>How satisfied are you with:</i>						
how your specific needs and preferences were considered and responded to in the selection of your AT?	1	2	3	4	5	N/A
the procedures and length of time it took for you to obtain your AT	1	2	3	4	5	N/A
the availability of training	1	2	3	4	5	N/A
the follow-up from health care professional/ community service provider	1	2	3	4	5	N/A
the repairs and servicing (maintenance) provided for your AT?	1	2	3	4	5	N/A

9. Who pays for all or most of your AT support(s)?

- ☐ You
☐ Your family
☐ Government program
☐ Insurance company
☐ Non-profit organization
☐ It is owned or provided by someone else (e.g. employer, friend, non-profit organization)
☐ Don't know
☐ Other (please specify) _____

10. If you use AT you do not personally own, where do you go to use it:

- ☐ Non-profit organization (e.g. community disability service centre)
☐ Local college or university
☐ Community employment agency
☐ Public library
☐ Don't know
☐ Other (please specify) _____

11. On a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree," how much do you agree or disagree that AT contributes to your independence in the following areas?

If an item does not apply to you, respond with N/A (not applicable).

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Not Applicable
Living Independently	1	2	3	4	5	N/A
Working	1	2	3	4	5	N/A
Participating in the community	1	2	3	4	5	N/A
Learning (school, general education)	1	2	3	4	5	N/A
Using computers and computer software	1	2	3	4	5	N/A

12. Do you feel you have AT needs that are not met?

- ☐ Yes ☐ No ☐ I don't know

13. In general, would you say that your health is:

- ☐ Excellent
☐ Good
☐ Fair
☐ Poor
☐ I don't know

14. What barriers have you faced in getting the right AT to suit your needs? (Check all that apply):

- | | |
|--|---|
| <input type="checkbox"/> High cost of AT | <input type="checkbox"/> Lack of funding for users |
| <input type="checkbox"/> Lack of training for users | <input type="checkbox"/> Frustration using AT |
| <input type="checkbox"/> Long insurance approval process | <input type="checkbox"/> Purchased wrong AT |
| <input type="checkbox"/> Lack of access to a local resource center | <input type="checkbox"/> Lack of skilled professionals to make good recommendations |
| <input type="checkbox"/> Lack of AT loaner equipment to try out for short-term use | <input type="checkbox"/> Don't know what AT devices are available |
| <input type="checkbox"/> No barriers | <input type="checkbox"/> Not enough technical support available |
| <input type="checkbox"/> Other _____
(please specify) | |

15. Are you familiar with any organization/institution offering AT programs in NL?

- ☐ Yes ☐ No

If yes, what is the name of the organization/institution? (check all that apply)

- ☐ Canadian National Institute for the Blind (CNIB)
☐ Learning Disabilities Association of NL (LDANL)
☐ The Independent Living Resource Centre (ILRC)
☐ Memorial University (i.e The Blundon Centre/Queen Elizabeth II Library Commons)
☐ The College of the North Atlantic
☐ Other _____

Section Three:

Please answer these questions if you are an AT User or are interested in obtaining AT.

16. An AT Recycling Program allows a person to swap, repair, recycle, or otherwise re-use various second-hand AT. Have you ever obtained, or considered obtaining, AT from such an AT Recycling program?

- ☐ Yes ☐ No ☐ I don't know

If yes, how satisfied were you with the following aspects of that AT Recycling Program?

	Not satisfied at all	Not very satisfied	More or less satisfied	Quite satisfied	Very satisfied	Not Applicable
Choice of AT	1	2	3	4	5	N/A
Condition of AT	1	2	3	4	5	N/A
Expertise of Staff	1	2	3	4	5	N/A
Technical Support	1	2	3	4	5	N/A

If no to question 16, what kept you from using, or considering using, an AT Recycling Program?

- ☐ Not aware of such a program
 ☐ Recycled AT was outdated
☐ No interest in second-hand AT
 ☐ Incompatibility with higher tech AT
☐ Located too far away
☐ Poor quality of second-hand AT
 ☐ No barriers
☐ Other _____
 (please specify)

17. Given what you know about AT recycling programs, would you recommend it to a friend?

- ☐ Yes
 ☐ No
 ☐ I don't know

18. An AT Lending Program allows individuals to borrow AT for short periods of time. Have you ever borrowed, or considered borrowing, AT from such an AT Lending Program?

- ☐ Yes
 ☐ No
 ☐ I don't know

If yes, how satisfied were you with the following aspects of that AT Lending Program?

	Not satisfied at all	Not very satisfied	More or less satisfied	Quite satisfied	Very satisfied	Not Applicable
Choice of AT	1	2	3	4	5	N/A
Condition of AT	1	2	3	4	5	N/A
Expertise of Staff	1	2	3	4	5	N/A
Loan period for the AT	1	2	3	4	5	N/A

If no, what kept you from using, or considering using, an AT Lending Program?

- ☐ Not aware of such a program
 ☐ Limited AT selection
☐ Loan period too short
 ☐ Located too far away
☐ No barriers
 ☐ A similar program already exists in my community
☐ Other _____
 (please specify)

19. Given what you know about AT lending programs, would you recommend it to a friend?

☐ Yes

☐ No

☐ I don't know

20. An AT Demonstration Centre displays the newest AT and allows people to try out AT with help from technical staff. Have you ever used, or considered using, such an AT Demonstration Centre?

☐ Yes

☐ No

☐ I don't know

If yes, how satisfied were you with the following aspects of that AT Demonstration Program?

	Not satisfied at all	Not very satisfied	More or less satisfied	Quite satisfied	Very satisfied	Not Applicable
Choice of AT	1	2	3	4	5	N/A
Demonstration of the AT	1	2	3	4	5	N/A
Training on how to use the AT	1	2	3	4	5	N/A
Expertise of staff	1	2	3	4	5	N/A
Technical support	1	2	3	4	5	N/A
Reliability of the AT (i.e. works well and does not need constant repair)	1	2	3	4	5	N/A

If no, what kept you from using, or considering using, an AT Demonstration Center?

☐ Not aware of such a program

☐ Centre located too far away

☐ Centre has limited AT devices

☐ No barriers

☐ A similar Centre already exists in my address community

☐ Staff was not skilled with AT to my needs

☐ Other _____

(please specify)

21. Given what you know about AT Demonstration Centers, would you recommend it to a friend?

☐ Yes

☐ No

☐ I don't know

22. How far would you be willing to travel to an AT Demonstration Centre?

- ☐ 0 – 1 hour ☐ 1-2 hours ☐ 2- 3 hours ☐ 3-4 hours ☐ 4 or more hours

23. Please put the following proposed new AT programs for NL in order of importance to you by ranking them from 1 to 3.

(1 = Most Important 2 = Important 3 = Least Important)

☐ **AT Recycling Program** (allows a person to swap, repair, recycle, or otherwise re-use various second-hand AT)

☐ **AT Lending Program** (allows individuals to borrow AT for short periods of time)

☐ **AT Demonstration Centre** (displays the newest AT and allows people to try out AT with help from technical staff)

Section Four:

35. Are you aware of any AT workshops and awareness sessions held in NL?

- ☐ Yes ☐ No ☐ I don't know

36. Have you attended?

- ☐ Yes ☐ No

If yes, were you satisfied with the information you received?

- ☐ Yes ☐ No ☐ I don't know

37. How often would you attend if there were more AT information and awareness sessions?

- ☐ Never ☐ Once a year ☐ Twice a year ☐ Three or more times a year

38. Currently, in NL, we do not have a toll-free hotline that answers questions about AT. If a toll-free hotline was available, how likely would you be to call for information on AT?

- ☐ Not at all likely
☐ Very unlikely
☐ More or less likely
☐ Somewhat likely
☐ Very likely

39. Would you be interested in getting regular news about AT and AT services in NL by email?

- ☐ Very interested
☐ Somewhat interested
☐ Not at all interested

40. Thinking about your most recent experience in obtaining AT, were there any areas of difficulty that you went through?

40. Are there any other recommendations you would like to make about how NL can better meet the AT needs of persons with disabilities in our province?

41. What are the first 3 characters of your postal code? _____

42. Are you: Male _____ Female _____

43. What is your year of birth? _____

44. What is your current level of family income:

- ☐ \$10,000 or less
☐ \$10,001 - \$30,000
☐ \$30,001 - \$50,000
☐ \$50,001 - \$70,000
☐ \$70,001 - \$90,000
☐ More than \$90,000

You have now completed the survey. Please place it in the pre-paid envelope provided to be returned.

Thank you for taking part in this study.

**Permission has been granted to use items from the Massachusetts Rehabilitation Commission AT Utilization survey and the Quebec User Evaluation of Satisfaction with Assistive Technology(QUEST)*

Appendix D – Letter of Recruitment

Dear _____:

My name is Valerie Penton and I am a Masters student in the Faculty of Medicine at Memorial University of Newfoundland. I am currently conducting research under the supervision of Diana Gustafson on the provision of Assistive Technology (AT) Services in Newfoundland and Labrador. As part of my thesis research, I am conducting interviews with residents and professionals such as service providers and representatives of funding agencies to discover their perspectives on the current system of AT services and supports in the province.

As you/your organization plays a key role in the delivery of AT services and supports, I would like to speak with you about your perspectives on intensification in and integration of new developments within the area of AT for Newfoundland and Labrador. This study will help to lend further understanding of, and satisfaction with, the current level of AT service delivery and resources, and seek to identify and develop a description of the components of an ideal single-entry access system for AT.

I am seeking postsecondary students and adult participants with vision, hearing, mobility, or learning impairments to complete a survey and/or take part in a focus group to talk about their experiences with, or knowledge of, AT. The surveys will take approximately 15 minutes and the focus groups may take up to 2 hours. I will also be conducting interviews with service providers and representatives of funding agencies. The interview will take approximately 1-2 hours to complete. Focus groups will be held in participants' local areas while the interviews may take place either in-person (locally) or over the phone.

Would you help me with recruitment by either participating directly in an interview or by informing your clients or associates about the study? I can provide paper notices for the focus groups that you can post at physical locations or hand out to potential participants. Or, if another method of recruitment is more appropriate, please let me know and I will be happy to accommodate an alternative method of contact.

The results of this study are expected to be available in May 2009, and I can provide a summary or full report to you for use then. If you have any questions/concerns, please contact either myself, or my thesis supervisor, through one of the means listed below.

Thank you for your time and cooperation.

Valerie Penton
Master's Student

Applied Health Services Research
Memorial University of Newfoundland
Email: vpenton@yahoo.com
Telephone: 709-777-8539

Diana L. Gustafson
Associate Professor of Social Sciences and Health
Division of Community Health and Humanities
Faculty of Medicine, Memorial University
St. John's, NL A1B 3V6
Tel: 709-777-6720; Fax: 709-777-7382
diana.gustafson@med.mun.ca

Appendix E – HIC Approval Letter



Faculty of Medicine

Human Investigation Committee
2nd Floor, Eastern Trust Bldg.
95 Bonaventure Avenue
St. John's, NL Canada A1B 2X5
Tel: 709 777 6974 Fax: 709 777 8776
hic@mun.ca www.med.mun.ca/hic

September 15, 2008

Reference #08.87

Ms. V. Penton
18A Cherokee Drive
St. John's, NL A1A 5Z7

Dear Ms. Penton:

RE: "Assessment of assistive technology (AT) provision in NL.

This will acknowledge receipt of your email correspondence, dated September 22, 2008

This correspondence has been reviewed by the co-chair under the direction of the Committee **Full approval** of this research study has been granted for one year effective May 22, 2008.

This is to confirm that the Human Investigation Committee reviewed and approved or acknowledged the following documents (as indicated):

- *Revised consent form, approved*

This approval will lapse on **May 22, 2009**. It is your responsibility to ensure that the Ethics Renewal form is forwarded to the HIC office prior to the renewal date. *The information provided in this form must be current to the time of submission and submitted to HIC not less than 30 nor more than 45 days of the anniversary of your approval date.* The Ethics Renewal form can be downloaded from the HIC website <http://www.med.mun.ca/hic/downloads/Annual%20Update%20Form.doc>

Please forward to the HIC office a copy the consent form omitting the track changes on it.

The Human Investigation Committee advises THAT IF YOU DO NOT return the completed Ethics Renewal form prior to date of renewal:

- *Your ethics approval will lapse*
- *You will be required to stop research activity immediately*
- *You may not be permitted to restart the study until you reapply for and receive approval to undertake the study again*

Ms. V. Penton
Reference # 08.87
September 15 2008

Page 2

Lapse in ethics approval may result in interruption or termination of funding

For a hospital-based study, it is **your responsibility to seek the necessary approval from Eastern Health and/or other hospital boards as appropriate.**

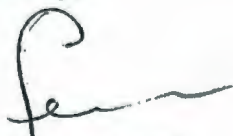
Modifications of the protocol/consent are not permitted without prior approval from the Human Investigation Committee. Implementing changes in the protocol/consent without HIC approval may result in the approval of your research study being revoked, necessitating cessation of all related research activity. Request for modification to the protocol/consent must be outlined on an amendment form (available on the HIC website) and submitted to the HIC for review.

This research ethics board (the HIC) has reviewed and approved the research protocol and documentation as noted above for the study which is to be conducted by you as the qualified investigator named above at the specified site. This approval and the views of this Research Ethics Board have been documented in writing. In addition, please be advised that the Human Investigation Committee currently operates according to *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* and applicable laws and regulations. The membership of this research ethics board is constituted in compliance with the membership requirements for research ethics boards as per these guidelines.

Notwithstanding the approval of the HIC, the primary responsibility for the ethical conduct of the investigation remains with you.

We wish you every success with your study.

Sincerely,



Fern Brunger, PhD
Co-Chair
Human Investigation Committee

Richard S. Neuman, PhD
Co-Chair
Human Investigation Committee

JDH;RSN\jed

C Dr. C. Loomis, c/o Office of Research, MUN
Mr. W. Miller, c/o Patient Research Centre, Eastern Health
Meeting date: September 25, 2008

Appendix F – Survey Consent Form

Dear Prospective Participant,

You have been invited to take part in a research study. It is up to you to decide whether to be in the study or not. This letter explains what the study is for, what risks you might take and what benefits you might receive. This study is being done as part of the research requirements for a Masters' Thesis through Memorial University of Newfoundland. It aims to gain more understanding of how people in NL get and use assistive technology (AT). AT is anything that is bought or made that makes it easier for people with disabilities to do things. This could mean a computer program to make words bigger, a different keyboard, or a wheelchair. In Newfoundland, there are few services for people with disabilities to learn more about AT and how to use it. So, maybe the results of this study will show the people who make important decisions that there is a need for more services in this area.

The survey you are being asked to complete will ask you some background questions. If you are over 19 years of age and less than 65 years old, with a vision, hearing, mobility, learning or other disability and decide to do the survey, you will be asked to answer some questions about any experience you have had with AT services in Newfoundland and Labrador (NL) and what you think about the experience. This survey may take up to 30 minutes. When you answer a question, it is okay if you are unsure; there are no right or wrong answers.

It is important to mention that the primary investigator is currently employed through the Learning Disabilities Association of Newfoundland and Labrador (LDANL). Risks may include a possible discovery of an individual's diagnosis. However, every effort will be taken to ensure confidentiality and anonymity. If you decide not to take part, or you leave the study, you can take any information you have given, and this will not affect your current status as a student or employee.

If you decide to stay, any information that you give will be stored in computer files, with password protection, and anything that describes who you are will be taken out for your privacy. The *presence* of the questionnaire will be mentioned to other participants during data collection in this study, but the results of the study will be shared with you before it is presented to anyone else outside of the research team or used in a published article.

You can talk to someone who is not involved with the study at all. They can tell you about your rights as a participant in a research study. This person can be reached through: Office of the Human Investigation Committee (HIC) at 709-777-6974 Email: hic@mun.ca

Sincerely,

Valerie Penton

M.S. (c) Applied Health Services Research, MUN

Phone number : 709-699-6316 EMAIL: b07vmp@mun.ca

Appendix G – Interview Consent Form

Consent to Take Part in Health Research

TITLE: Assessment of Assistive Technology (AT) Provision in Newfoundland and Labrador (NL)

INVESTIGATOR(S): Valerie Penton (Principle Investigator)

SPONSOR: Atlantic Regional Training Centre (ARTC)

You have been invited to take part in a research study. It is up to you to decide whether to be in the study or not. Before you decide, you need to understand what the study is for, what risks you might take and what benefits you might receive. This consent form explains the study.

The researchers will:

- **discuss the study with you**
- **answer your questions**
- **keep confidential any information which could identify you personally**
- **be available during the study to deal with problems and answer questions**

This study is being done as part of the research requirements for a Masters' Thesis through Memorial University of Newfoundland. It aims to gain more understanding of how people in NL get and use AT. AT is anything that is bought or made that makes it easier for people with disabilities to do things. This could mean a computer program to make words bigger, a different keyboard, or a wheelchair.

In Newfoundland, there are few services for people with disabilities to learn more about AT and how to use it. So, maybe the results of this study will show the people who make important decisions that there is a need for more services in this area.

You are being asked to take part in a one-to-one interview to talk about any experience you have had with the provision of AT services in Newfoundland and Labrador (NL) and what your views are about the experience. If you are over 19 years of age and less than 65 years old, with a vision, hearing, mobility, or learning impairment, or you are a disability service provider, you are eligible to take part in an interview. The interview will be approximately an hour and may be video/audio-recorded.

It is important to mention that the primary investigator is currently employed through the Learning Disabilities Association of Newfoundland and Labrador (LDANL). However, every effort will be taken to ensure confidentiality and anonymity. Risks may include possible discovery of an individual's diagnosis. If you decide not to take part, or you leave the study, you can take any information you have given, and this will not affect your current status as an employee of whichever organization you are affiliated with.

If you decide to stay, any information that you give will be stored in computer files, with password protection, and anything that describes who you are will be taken out for your privacy. The consent forms will be kept separate from any recorded or written information. The results of the study will be shared with you before it is presented to anyone else outside of the research team or used in a published article.

Signing this form gives us your consent to be in this study. It tells us that you understand the information about the research study. When you sign this form, you do not give up your legal rights. Researchers or agencies involved in this research study still have their legal and professional responsibilities.

You can talk to someone who is not involved with the study at all. They can tell you about your rights as a participant in a research study. This person can be reached through:

Office of the Human Investigation Committee (HIC) at 709-777-6974

Email: hic@mun.ca

After you have signed this consent form, you will be given a copy.

Signed _____

Date _____

Appendix H – Poster

ASSISTIVE TECHNOLOGY SURVEY



Memorial University is doing research about assistive technology services and supports in Newfoundland and Labrador (NL).

Anyone living in NL, between the ages of **19 and 65** having difficulty with **vision, hearing, mobility, or learning** can share their experiences with assistive technology through a survey.

Please take a slip below with the number/email to request the link for the online survey or a paper copy.



Contact person: Valerie (709) 777-6213

Email: b07vmp@mun.ca

Valerie 709-699-6316
Email: b07vmp@mun.ca

Valerie 709-699-6316
Email: b07vmp@mun.ca

Valerie 709-699-6316
Email: b07vmp@mun.ca

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Valerie 709-699-6316
Email: b07vmp@mun.ca

Valerie 709-699-6316
Email: b07vmp@mun.ca

Appendix I – Interview Guide for Semi-Structured Interview

Possible questions for Service Providers:

1. When did you begin working in Disability Services?
2. What technology-based programs and services are offered at your organization/institution?
3. If applicable, what are the Assistive Technology components of the training program(s) at your organization?
4. In your opinion, do these training programs reflect and support the mission, vision and values of your organization/institution?
5. What are the identified resources to solicit and obtain funding for assistive technology at your organization/institution?
6. What is your level of training in AT? OR Have you acquired any training on AT? If so, where and how (i.e. was it funded?) did you acquire such training?
7. Over the years, have you seen changes in the System for delivery of disability services and supports? Describe these changes. Describe positive and negative changes.
8. What is your opinion of the current level of AT service delivery in your area? Are you aware of any?
9. What are your concerns about the present system of delivery (i.e. assessment, procedures, length of time, etc) for assistive technology devices, services and supports?
10. What do you envision as needed tomorrow that is not available now? As needed within five years?
11. What improvements, if any, would you suggest be made in the area of AT provision for NL?

Appendix J – Background Information on My Study

Attn:

My name is Valerie Penton and I am a Masters student in the Faculty of Medicine at Memorial University of Newfoundland. I am currently conducting research under the supervision of Diana Gustafson on the provision of Assistive Technology (AT) Services in Newfoundland and Labrador. This study will help to lend further understanding of, and satisfaction with, the current level of AT service delivery and resources, and seek to identify and develop a description of the components of an ideal single-entry access system for AT (i.e. a place for people with disabilities to access a broad range of information related to AT, and receive training on the use of the technology, as well as technical support).

As part of my thesis research, I am conducting interviews with disability service professionals, such as service providers for community organizations, to discover their perspectives on the current system of AT services and supports in the province. As you/your organization plays a key role in the delivery of disability services and supports, I would like to speak with you about your perspectives on intensification in and integration of new developments within the area of AT for Newfoundland and Labrador. The interview will take approximately 1 hour to complete and may take place either in participants' local areas or over the phone.

I am also seeking postsecondary students and adults (between the ages of 19 and 65) with vision, hearing, mobility, learning or other impairments, to complete a survey. This survey will examine their experiences with, or knowledge of, AT services and supports in relation to their educational and career goals. The surveys will take approximately 30 minutes. I will also be conducting key informant interviews with service providers.

Would you assist me with recruitment by either participating directly in an interview or by informing your clients or associates about the study?

The results of this study are expected to be available in October 2009, and I can provide a summary or full report to you for use then. If you have any questions/concerns, please contact either myself, or my thesis supervisor, through one of the means listed below.

Thank you for your time and cooperation.

Valerie Penton
Masters student
Applied Health Services Research
Memorial University of Newfoundland
Email: b07vmp@mun.ca
Telephone: 709-699-6316

Diana L. Gustafson, Associate Professor
Social Sciences and Health
Division of Community Health and
Humanities, Faculty of Medicine, MUN
St. John's, NL A1B 3V6
Tel: 709-777-6720 Fax: 709-777-7382
diana.gustafson@med.mun.ca

Appendix K – Some Responses to Survey Open-ended Questions

Difficulties	Recommendations
None	There are some provinces who have a cost sharing program which helps people purchase AT they need. I think Newfoundland & Labrador should have one as well (client pay 25% GOV pays \$75%)
Obtaining funding	Having these programs in my immediate area
While there are some programs for providing funding for AT for education/employment, individuals must often fit into very specific criteria to qualify. Funding for the purchase of personal/household AT is non-existent in NL. Other provinces have cost sharing programs in place to assist in the purchase of personal/household AT, ie. in Ontario, the province will reimburse an individual purchase of AT up to 80%. The price of some AT such as a CCTV is far beyond the financial reach of many individuals. Such a cost-sharing program would promote independence.	One problem that seems to exist in NL is getting AT producers to provide demos to institutions such as the CNIB.
Adjusting from Analog to Digital Hearing Aids	Funding available for expensive equipment that one needs to be fully integrated into society
Unable to hear students' Q's in background. Problem hearing in round table group discussions.	Professors should use Speech Recognition Software.
Delays in Government Funding. Difficulty getting response back from case workers. Mistakes to AT budgets delaying getting necessary funding.	More AT training and technical support. Government programs to run more efficiency and accurately.
Could be more information provided to someone who has a severe LD	Let people know about it more by going into schools, hospitals, group homes. Give them a free try at using the equipment or software that can help them live a normal life
Waiting to get my wheelchair	Faster assessment process to obtain devices
Unaware of support	More awareness and acknowledgement
None	Simplify wording, make schools more knowledgeable on AT
Cost- student study grant did not cover everything	Better government funding
Getting costs covered - so expensive	Approve funding for low income people to buy what is needed
Cost of devices	
Trying to convince people that I actually needed the product and what was required	There definitely needs to be much more information available regarding these devices. Employers need to be made much more aware of what is out there and why they should consider investing in such technology for their employees and what benefits they will gain from making such investments.



